INSTALLATION RESTORATION PROGRAM
PHASE I: RECORDS SEARCH
WRIGHT-PATTERSON AFB, OHIO

Prepared for
United States Air Force
AFESC/DEV
Tyndall AFB, Florida

February, 1982

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The Resource Conservation and Recovery Act of 1976 was promulgated to regulate the generation, transportation, storage, treatment, and disposal of hazardous wastes. Simultaneous to the passage of RCRA, the Department of Defense devised a Comprehensive Installation Restoration Program to identify, report, and correct potential environmental deficiencies that could (Cont'd on Page 2)

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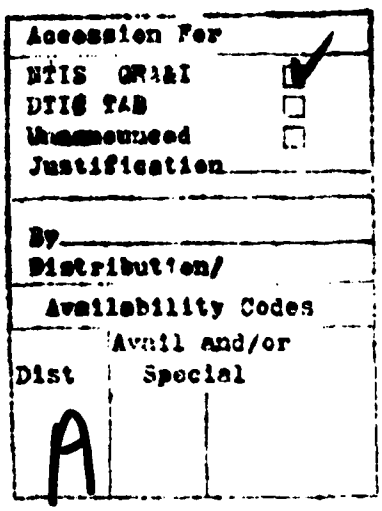
result in groundwater contamination and probable migration of contaminants beyond DOD installation boundaries. Engineering - Science was retained by the Air Force Engineering and Services Center on 15 July 1981 to conduct a records search for Wright-Patterson AFB, the first phase of the Installation Restoration Program. The on-site portion of the records search was performed at Wright-Patterson AFB on 29 and 30 September and 19 through 23 October 1981. During this period, formal interviews were conducted with base personnel familiar with past waste disposal practices and file searches were performed for identified facilities which have generated, handled, transported, or disposed of waste materials. This study contains a summary of Engineering - Science's findings and a rating of potential contamination for each suspected contaminated site.

This report has been prepared for the U.S. Air Force by Engineering-Science for the purpose of aiding in the implementation of the Air Force Installation Restoration Program. It is not an endorsement of any product. The views expressed herein are those of the contractor and do not necessarily reflect the official views of the publishing agency, the United States Air Force or the Department of Defense.



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EXECUTIVE SUMMARY

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The Resource Conservation and Recovery Act of 1976 (RCRA) was promulgated to regulate the generation, transportation, storage, treatment and disposal of hazardous wastes. Simultaneous to the passage of RCRA, the Department of Defense (DOD) devised a Comprehensive Installation Restoration Program (IRP) to identify, report and correct potential environmental deficiencies that could result in groundwater contamination and probable migration of contaminants beyond DOD installation boundaries. The IRP has been developed as a three phase program:

- Phase I - Problem Identification/Records Search
- Phase II - Problem Confirmation and Quantification
- Phase III - Corrective Action

Engineering-Science (ES) was retained by the Air Force Engineering and Services Center on 15 July 1981, to conduct the Wright-Patterson AFB Records Search under Contract No. F08637-80-G0009, Call No. 0010, using funding provided by the Air Force Logistics Command.

The on-site portion of Phase I was performed at Wright-Patterson AFB on September 29 and 30, and October 19 through October 23, 1981. During this period formal interviews were conducted with base personnel familiar with past waste disposal practices, and file searches were performed for identified facilities which have generated, handled, transported, and disposed of waste materials.

INSTALLATION DESCRIPTION

Wright-Patterson AFB is located in southern Ohio approximately 60 miles northeast of Cincinnati and 50 miles southwest of Columbus. The base covers 8,511 acres and is situated in the floodplain of the Mad River. The base is bordered on the west by the Mad River, the north by

State Route 235, the east by State Route 444 and the south by Col. Glenn Highway.

ENVIRONMENTAL SETTING

As a result of our on-site visit, the following observations have been made with regard to the environmental sensitivity of Wright-Patterson AFB:

- The Wright-Patterson area experiences moderate amounts of precipitation and snowfall annually.
- Base soils are typically permeable sands and gravels of glacial origin.
- The primary regional aquifer, outwash (valley train) sediments underlies the base at shallow depth (25 to 50 feet).
- Wright-Patterson Air Force Base and the City of Dayton obtain potable water supplies from the outwash (valley train) aquifer.
- Other unconsolidated water-bearing units are present on base or exist in close proximity to the base.
- Ground water system recharge depends in part upon or has been induced from the flow of base streams (Mud Run and Hebble Creek).

The above points indicate that the potential for migration of contamination to area aquifers is high due to their characteristic high permeabilities and transmissivities. The primary receptors of migrating waste contamination would be local surface waters and local aquifers.

PROCEDURES

A review of all waste generation sources at the base was conducted to determine past disposal methods for hazardous wastes. This review included industrial shops areas, laboratories, pesticide and herbicide utilization, radioactive waste sources, fire control training area, hazardous waste storage areas and POL (Fuels Management) areas. Past and present waste materials were identified and the disposal methods used for each source were determined according to base records or interviews. The waste management facilities included on-site landfills (twelve sites), storm sewers, burial areas, petroleum burn tanks, septic tanks and off-site hazardous waste contract disposal.

Twenty four sites located on Wright-Patterson AFB property were identified as containing hazardous material resulting from past handling or disposal activities. These sites have been assessed using a rating system which takes into account factors such as site characteristics, waste characteristics, potential for contamination and waste management practices. The details of the rating procedure are presented in Appendix G and the results of the assessment are given in Table 1. Rating scores were developed for the individual sites and the sites are listed in order of ranking. The rating system is designed to indicate the relative need for more detailed site assessment and/or remedial action.

FINDINGS AND CONCLUSIONS

Based on the results of the project team's field inspection, review of records and files, and interviews with base personnel, the following conclusions have been developed. The conclusions are listed by category.

Landfills

a. Landfill No. 10 (Woodland Hills) has the greatest potential for off-site migration of contaminants.

b. Landfill No. 8 which is adjacent to Building 821 has a high potential for contaminant migration.

c. Landfill No. 12 also poses a high potential for contaminant migration.

d. Landfill No. 11 poses a moderate contamination potential.

e. Landfills No. 2 and 3, 4, 6 and 7 and No. 9 pose a moderate contamination potential.

Fire Training Areas

a. Fire Training Areas 3 and 4 pose a high contamination potential.

b. Fire Training Area No. 1 and No. 2 both pose a moderate potential for contaminant migration.

Spills

Spills No. 2 and No. 3 both have a moderate potential for contaminant migration.

TABLE 1
SUMMARY RANKING OF POTENTIAL
CONTAMINATION SOURCES

Rank	Site Name	Period of Operation	Overall Score
1	Landfill No. 10 (Woodland Hills)	1965-1968	82
2	Landfill No. 8	1955-1962	79
3	Fire Training Areas 3 & 4/ Spills No. 1	1960-1980	77
4	Spill No. 2	Apr. 1976	74
5	Landfill No. 12	1968-1973	73
6	Spill No. 3	Mar. 1981	72
7	Landfill No. 11	1968-1977	71
8	Landfill No. 5 (Twin Lakes)	1945-Present	63
9	Fire Training Area No. 1	1950-1955	63
10	Landfill No. 2 (Tillman Pit)	1941-1955	62
11	Landfills No. 3,4,6 & 7	1945-1962	61
12	Fire Training Area No. 2	Late 1950's	61
13	Landfill No. 9 (Sandhill)	1962-1964	60
14	Coal Storage Pile	Long Term	60
15	Central Heating Plant No. 2 (Bldg. 271)	1940's-1980	59
16	Burial Site No. 1	1966-1971	58
17	Burial Site No. 2	1971-1975	56
18	Landfill No. 1	1920's-1940	56
19	Central Heating Plant No. 1 (Bldg. 66)	1930-1980	55
20	Central Heating Plant No. 3 (Bldg. 170)	1939-1980	50
21	Radioactive Waste Burial Site	Before 1951	47
22	Deactivated Nuclear Reactor	1965-1970	47
23	Central Heating Plant No. 4 (Bldg. 1240)	1957-Present	46
24	Central Heating Plant No. 5 (Bldg. 770)	1956-Present	44

Central Heating Plants

a. The long term coal storage pile located east of the POL Area in Area C has a moderate potential for contaminant migration.

b. Central Heating Plant No. 1, 2, 3, 4 and 5 all pose a low potential for contaminant migration.

Burial Sites

Burial Site No. 1 and No. 2 were utilized for the disposal of tetraethyl lead gasoline bottoms. These sites pose a low potential for contaminant migration.

Radioactivity

a. The deactivated nuclear reactor poses a low pote· .al for contaminant migration.

b. The radioactive waste burial whose contents are nown poses a low potential for contaminant.

RECOMMENDATIONS

The following recommendations are made to further assess potential for contaminant migration from waste disposal areas at Wright-Patterson Air Force Base. The recommended monitoring program for Phase II is summarized as follows:

Site	Monitoring Technique
Landfills No. 10 (Woodland Hills)	Ground Water Monitoring Leachate Grab Sampling
Landfill No. 8	Ground Water Monitoring Leachate Grab Sampling
Fire Training Areas 3 & 4/ Spill No. 1	Ground Water Monitoring
Spill No. 2	Ground Water Monitoring
Landfill No. 12	Ground Water Monitoring
Spill No. 3	Ground Water Monitoring
Landfill No. 11	Ground Water Monitoring
Landfill No. 5 (Twin Lakes)	Ground Water Monitoring

Site	Monitoring Technique
Fire Training Area No. 1	Ground Water Monitoring
Landfill No. 2 (Tillman Pit)	Ground Water Monitoring
Landfill Nos. 3, 4, 6 & 7	Ground Water Monitoring
Fire Training Area No. 2	Ground Water Monitoring
Landfills No. 9 (Sandhill)	Ground Water Monitoring
Coal Storage Pile	Ground Water Monitoring
	Soil Sampling

Other recommendations address analyzing water samples from Well No. 10, B and D for all parameters from EPA's priority pollutant list. In addition recommendations address the compatibility of the Air Force Petroleum Handling Regulations regarding tetraethyl lead sludge from the storage of leaded gasoline and the current RCRA regulations.

CHAPTER 1

INTRODUCTION

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INTRODUCTION

BACKGROUND

The discharge, disposal and storage of solid wastes into or on the land surface is regulated by both state and federal laws. The key legislation governing the management and disposal of solid waste is the Resource Conservation and Recovery Act of 1976 (RCRA). The Act was promulgated to regulate the generation, transportation, treatment, storage and disposal of hazardous wastes; to phase out the use of open dumps for disposal of solid wastes; and to promote the conservation of natural resources through the management, reuse or recovery of solid and hazardous waste. Regulations and implementation instructions of RCRA are continuing to be developed by the U.S. Environmental Protection Agency (EPA).

Under RCRA Section 3012 (PL-96-482, October 21, 1980), each state is required to inventory all past and present hazardous waste disposal sites. Section 6003 of RCRA requires federal agencies to assist EPA and make available all requested information on past disposal practices. It is the intent of the Department of Defense (DOD) to comply fully with these as well as other requirements of RCRA.

AUTHORITY

Simultaneous with the passage of RCRA, the DOD devised a comprehensive Installation Restoration Program (IRP). The purpose of the IRP is to assess and control migration of environmental contamination which may have resulted from the DOD operations and probable migration of contaminants beyond the DOD installation boundaries. In response to RCRA and in anticipation of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (Superfund), the DOD issued directive DEQPPM 80-6 (Defense Environmental Quality Program Policy Manual, June 1980) requiring identification and evaluation of past

hazardous waste disposal sites on DOD agency reservations. The U.S. Air Force implemented DEQPPM 80-6 by message in December 1980. The program was revised by DEQPPM 81-5 issued in January 1982.

PURPOSE AND SCOPE OF THE ASSESSMENT

The Installation Restoration Program has been developed as a four-phased program as follows:

Phase I - Problem Identification/Records Search

Phase II - Problem Confirmation and Quantification

Phase III - Technology Base Development

Phase IV - Corrective Action

Engineering-Science (ES) was retained by the Air Force Engineering and Services Center to conduct the Phase I Records Search at Wright-Patterson AF Base under Contract No. F08637-80-G0009, Call No. 0010, using funding provided by the Air Force Logistics Command. This report contains a summary and an evaluation of the information collected during Phase I of the IRP.

Phase I Project Description

The goal of the first phase of the program was to identify the potential for environmental contamination from past waste disposal practices at Wright-Patterson AFB, and to assess the probability of contaminant migration beyond the installation boundary. The activities undertaken in Phase I included the following:

- Review site records
- Interview key personnel familiar with past generation and disposal
- Inventory wastes
- Determine quantities and locations of current and past hazardous waste storage, treatment and disposal
- Define environmentally sensitive conditions at the base
- Evaluate past disposal practices and methods
- Conduct field inspection
- Gather pertinent information from federal, state and local agencies
- Assess potential for contamination
- Determine potential for materials to migrate off site

In order to perform the on-site portion of the records search phase, ES assembled the following core team of professionals:

- C. M. Mangan, Environmental Engineer and Project Manager, MSCE, 14 years of professional experience
- J. R. Absalon, Hydrogeologist, BS Geology, 9 years of professional experience
- M I. Spiegel, Environmental Scientist, BS Environmental Health Science, 5 years of professional experience
- M. A. Guthrie, Environmental Engineer, MSCE, 1 year of professional experience

More detailed information on these individuals is presented in Appendix A.

METHODOLOGY

The methodology utilized in the Wright-Patterson AFB Records Search began with a review of past and present industrial operations conducted at the base. Information was obtained from available records such as shop files and real property files, as well as interviews with past and present base employees from the various operating areas of the base. The interviewees included current and past environmental personnel associated with the Civil Engineering Squadron, Bioenvironmental Engineer's office, and the Directorate of Maintenance. Several current or past personnel associated with the fire protection, wastewater treatment plant, pesticide program, fuels management and solid waste collection and disposal were interviewed extensively. Finally, experienced personnel from the tenant organizations were interviewed. Seventy-five interviews were conducted to obtain the needed past activity information.

Concurrent with the base interviews the applicable federal, state and local agencies were contacted for pertinent base related environmental data. The agencies contacted are listed as follows:

- o U.S. Soil Conservation Service, Dayton, Ohio
- o U.S. Geological Survey, Columbus, Ohio
- o Fairborn Water Department, Fairborn, Ohio
- o Dayton Water Department, Dayton, Ohio
- o Ohio Division of Water, Columbus, Ohio
- o Ohio Division of Geological Survey, Columbus, Ohio

- o Miami Conservancy District, Dayton, Ohio
- o Miami Valley Regional Planning Commission, Dayton, Ohio

The next step in the activity review was to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from the various operations on the base. Included in this part of the activities review was the identification of all known past landfill sites and burial sites; as well as any other possible sources of contamination such as fuel-saturated areas resulting from spills.

An aerial overflight and a general ground tour of identified sites were then made by the ES Project Team to gather site specific information including (1) evidence of environmental stress, (2) the presence of nearby drainage ditches or surface-water bodies, and (3) visual inspection of these water bodies for any obvious signs of contamination or leachate migration.

A decision was then made, based on all of the above information, whether a potential exists for hazardous material contamination at any of the identified sites using the decision tree shown later in Figure 4.1. If not, the site was deleted from further consideration. For those sites where a potential for contamination was identified, a determination of the potential for migration of the contamination off the installation boundaries was made by considering site-specific conditions. If the potential for contaminant migration was considered significant, then the site was evaluated and prioritized using the site rating methodology.

The site rating indicates the relative potential for contaminant migration at each site. For those sites showing a higher potential, recommendations are made to quantify the potential contaminant migration problem under Phase II of the Installation Restoration Program. For those sites showing a medium potential, a limited Phase II program may be recommended to confirm that a contaminant migration problem does or does not exist. For those sites showing a low potential, no further follow-up Phase II work would be recommended.

CHAPTER 2

INSTALLATION DESCRIPTION

CHAPTER 2

INSTALLATION DESCRIPTION

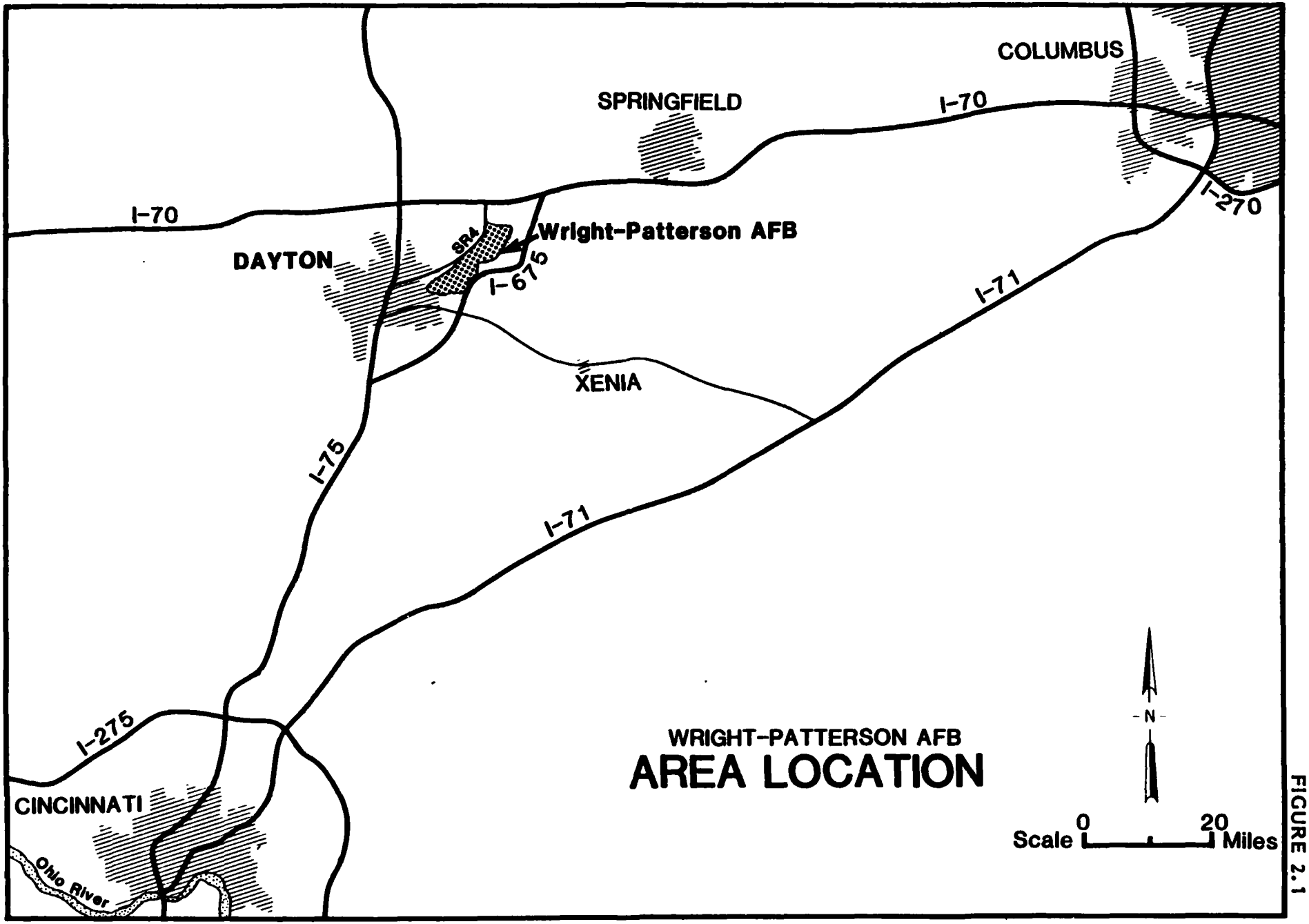
LOCATION, SIZE AND BOUNDARIES

Wright-Patterson AFB is located in southwestern Ohio east of the city of Dayton as shown in Figure 2.1. It is approximately 60 miles northeast of Cincinnati and approximately 50 miles southwest of Columbus.

The installation is composed of two air fields (Wright and Patterson) separated by State Route 444 and the Consolidated Rail Corporation tracks (See Figures 2.2 and 2.3). Wright Field, designated Area B is situated in both Montgomery and Green Counties. Patterson Field, composed of Areas A and C, is located within Green County except for about 15 acres lying along the Mad River that are in Montgomery County. Clark County, abuts the base at the northeast property line.

Area B encompasses approximately 2800 acres and is bordered on the north by State Route 444 and on the east by Wright State University and on the south by Airway Road and on the west by Springfield Pike. Area B is made up of a complex of over 200 buildings (not including family housing) with a gross floor area of over 6,000,000 square feet. The western half of Area B was once solely occupied by the runway system. Today, the runways are no longer utilized for flying. Several new facilities have recently been constructed in this area with the largest being the Air Force Museum.

Areas A and C encompass 5711 acres and are physically separated from Area B by State Route 444 on the south and east. It is bordered to the north by State Route 235 and to the west by the Mad River. Area A has a mixture of land uses ranging from storage and warehousing to offices and classrooms. Area C is largely utilized by the flying field. The built-up area adjacent to the city of Fairborn is comprised of



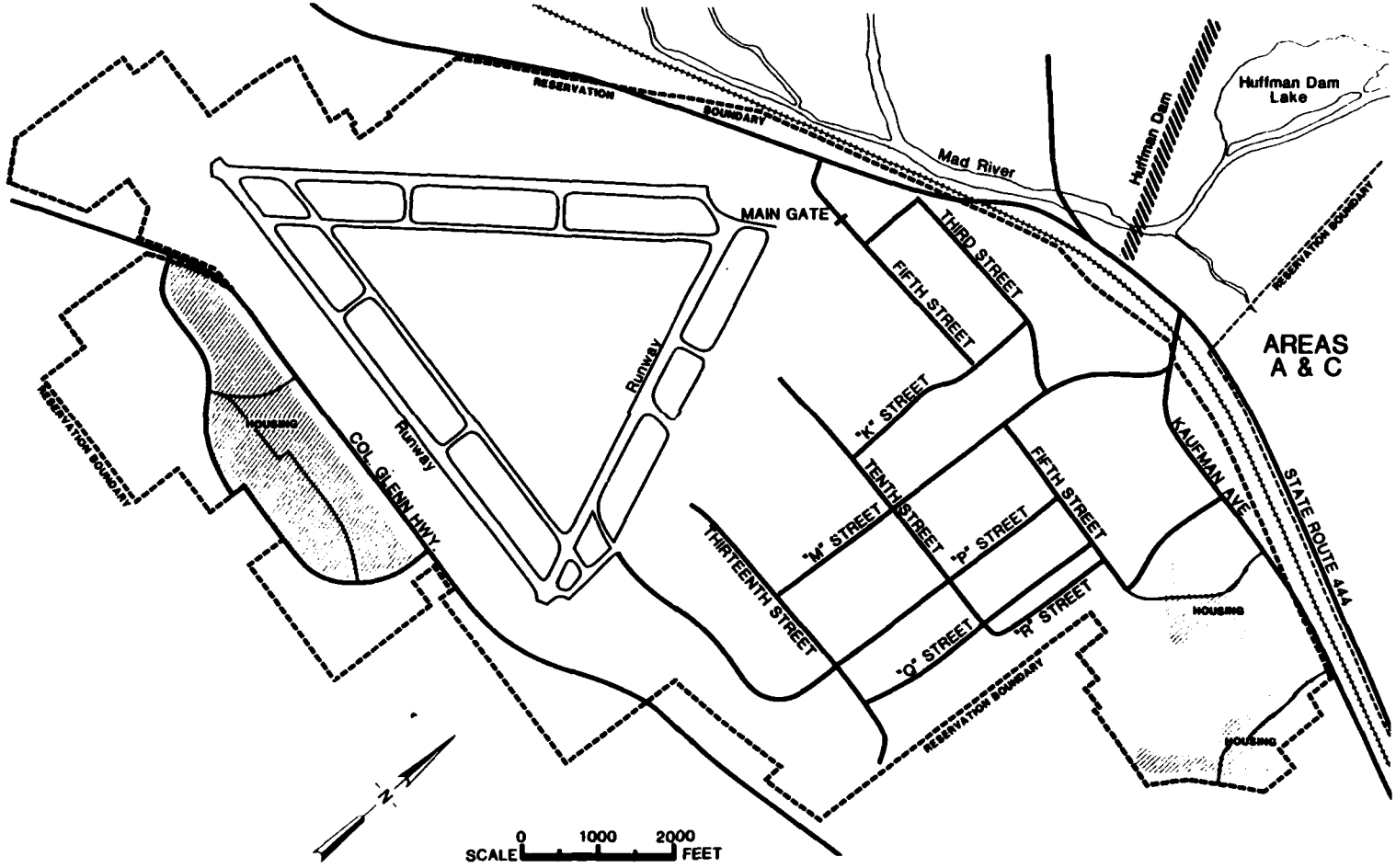
WRIGHT-PATTERSON AFB

AREA LOCATION

FIGURE 2.1

WRIGHT-PATTERSON AFB

SITE PLAN - AREA B

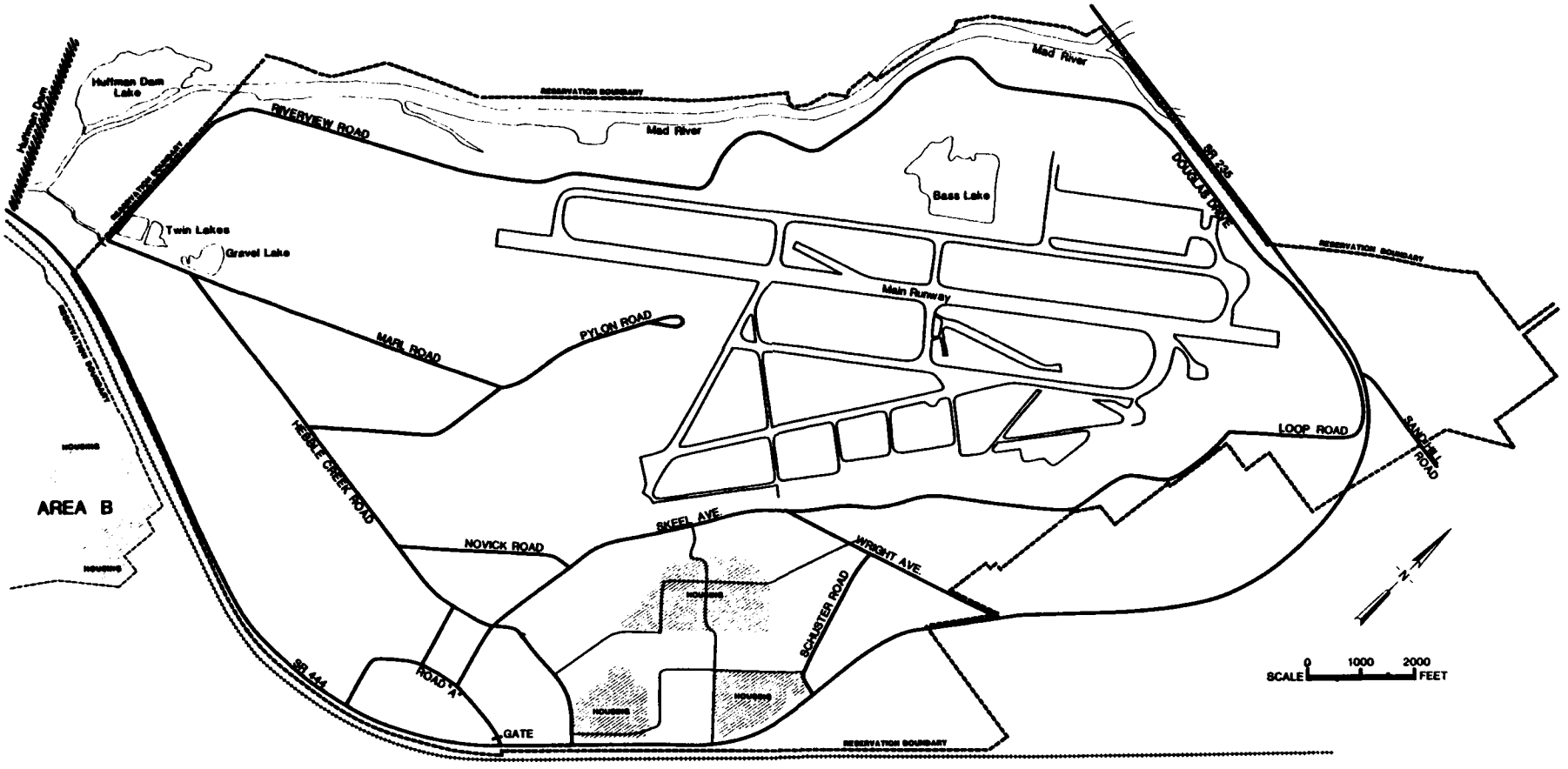


SOURCE: WRIGHT PATTERSON AFB INSTALLATION DOCUMENTS

FIGURE 2.2

WRIGHT-PATTERSON AFB

SITE PLAN - AREAS A & C



SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

FIGURE 2.3

offices, storage, industrial and flight line facilities. Dormitories for enlisted personnel and support facilities are located in Kitty Hawk Center. A brief installation history is presented in Appendix B.

CURRENT ORGANIZATION AND MISSION

Primary Mission

The host for Wright-Patterson AFB is the 2750th Air Base Wing which employs 16 percent of the approximately 24,000 persons assigned to the base. In its responsibility for this installation, 2750th is charged with the operation and maintenance of real property at Wright-Patterson AFB. This amounts to 18,683,454 square feet of floor space. Through host-tenant support agreements, the wing provides utilities, communications, supplies, transportation, staff assistance and other services necessary for the tenants to accomplish their individual missions.

Tenant Mission

Air Force Logistics Command

Wright-Patterson AFB is the resident location for the command headquarters of the Air Force Logistics Command. This major air command provides world-wide technical logistics support to the Air Force's aerospace weapons systems. Its customers include all the United States Air Force, the Air Force Reserve, the Air National Guard and the Air Forces of 60 foreign counties. From its headquarters buildings in Area A, the most modern management techniques and sophisticated computer systems are used to keep the Air Force's equipment and supplies flowing smoothly through the logistics pipelines.

The Command has five major field organizations, known as Air Logistic Centers (ALC's) which are responsible for specific weapon systems throughout the world. These ALCs are located at Robins AFB, Georgia; Kelly AFB, Texas; Hill AFB, Utah; McClellan AFB, California; and Tinker AFB, Oklahoma. AFLC also has two specialized organizations: the Military Aircraft Storage and Disposition Center at Tucson, Arizona, which stores, reclaims or disposes of excess aircraft for all services and the Aerospace Guidance and Meterology Center at Newark AFS, Ohio, the Air Force's center for maintaining and calibrating precision instruments.

Air Force Acquisition Logistics Division (AFALD)

AFALD was established to provide a greater degree of logistics unity to achieve the maximum reduction of weapon systems life cycle costs. The division improves the interchange of information between AFLC and Air Force Systems Command (AFSC), particularly the flow of feedback data from Air Force combat commands using the systems.

Air Force Systems Command

Nine major organizations of Air Force Systems Command are located at Wright-Patterson AFB. AFSC Headquarters, itself, is located at Andrews AFB, Maryland. The major organizations located at Wright-Patterson AFB are:

1. Aeronautical Systems Division. Aeronautical Systems Division (ASD) is the Command's focal point for planning engineering, and managing the development, testing and acquisition of all aeronautical weapon systems and related equipment for the U.S. Air Force. Major programs include a manned strategic bomber, the B-1; an air superiority fighter, the F-15, the strategic Short Range Attack Missile (SRAM); and the electro-optical Maverick tactical missile. Within ASD is the 4950th Test Wing which conducts extensive flight tests in support of ASD and the laboratories at Wright-Patterson.
2. Foreign Technology Division. The Foreign Technology Division (FTD) acquires, evaluates, analyzes and reports on foreign scientific and technological equipment in order to reduce the possibility of technological surprise. FTD acquires, analyzes and evaluates scientific and technical information from many sources. Personnel using specialized equipment, including computers and a modern language translator capable of translating Russian to English at a rate of 300,000 words per day, produce finished intelligence studies on foreign aerospace technologies and electronic, aerodynamic, ballistic and space studies.
3. AFSC Laboratories. Six laboratories of AFSC are also located at Wright-Patterson AFB. Four of the laboratories are included in the newly activated Air Force Wright Aeronautical Laboratory. They are the Air Force Materials Laboratory, the Air Force Aero Propulsion Laboratory, the Air Force Flight Dynamics

Laboratory and the Air Force Avionics Laboratory. The remaining two laboratories are the Aerospace Medical Research Laboratory and the Air Force Human Resources Laboratory. These laboratories do research and are the focal point for the full exploratory and advanced development programs in their assigned areas of expertise.

The Materials Laboratory assures that the materials used by the Air Force, whether in-flight clothing or on the wing of the aircraft are the best available.

The Aero Propulsion Laboratory develops air breathing engines, engine components and new power generating devices for all types of aircraft, from helicopters, and vertical take-offs and landing aircraft through MACH 3 intercepters and missiles.

The Flight Dynamics Laboratory is concerned with an aircraft configuration, structural integrity, flight control instruments, escape devices, landing gear and environmental control.

The Avionics Laboratory represents the merging of aviation and electronics and embraces communications, navigation and guidance, weapon delivery, electronic warfare, reconnaissance and surveillance, and the advancement of technology in these areas.

The Aerospace Medical Research Laboratory sees to the most important component in any system, the man. They determine how much heat, cold, vibration, shock, noise, toxicity, acceleration, decompression, tumbling, and confusion man can take and still do his job as part of the man-machine system.

The Human Resources Laboratory also concentrates on the human side of the weapon system development. They make certain that a weapon system can be properly operated, maintained and supported assuring that the man and the machine are matched.

Air Force Institute of Technology (AFIT)

The Air Force Institute of Technology, a component of Air University, is responsible for the scientific, engineering, managerial, medical, and related professional education of Air Force officers. The Institute offers both resident and non-resident undergraduate and graduate education as well as comprehensive continuing education research programs. The student body numbers approximately 17,000 officers,

enlisted personnel, and civilians who attend one of the AFIT programs each year.

2046th Communications Group

The 2046th Communications Group provides communications support to USAF, Major Command Headquarters, WPAFB Command, host and tenant organizations, and civil agencies. The group operates and maintains a 10,000-line switching system which services 25,000 telephones on Base. It operates three communication centers giving customers access to the worldwide AUTOVON system; the control tower and RAPCON facilities, 24-hours per day, for safe and efficient flow of air traffic; and maintains navigational aids for the Base. Other services include vehicle radio, point-to-point teletype, point-to-point data links, and emergency communications via the Military Affiliate Radio Systems (MARS).

USAF Medical Center

This Medical Center, located at Wright-Patterson AFB, is the second largest medical center in the Air Force. Its modern well-equipped facilities provide efficient in-patient and out-patient services for local military personnel and their families. This 330-bed center also provides speciality care for the greater portion of the northeastern and northcentral sections of the United States. The Medical Center is a receiving point for patients air evacuated from Air Force hospitals throughout the world and specifically from Ohio, Indiana, Illinois, Kentucky, Tennessee, West Virginia, Michigan, Wisconsin, Maine, New Hampshire, Massachusetts, New York, Canada and Greenland.

Air Force Museum

The Museum displays items of historical and current significance in the field of military aviation relating to the United States Air Force. It tells an authoritative and illustrated story of flight from mythological times to the present, featuring over 100 military aircraft and missiles. The Air Force Museum is recognized as the largest and most complete military aviation museum in the World.

Military Airlift Command

Several Military Airlift Command (MAC) organizations operate on the Wright-Patterson AFB.

MAC Detachment 15, 15th Weather Squadron. This detachment provides weather services to all Base units. The detachment furnishes a staff

weather officer to the Air Force Logistics Command.

Detachment 5, 6th Weather Squadron. This detachment provides field-level maintenance of weather detachments from upper Michigan to the lower border of Tennessee, and from the Mississippi River to the Appalachian Mountains.

Headquarters MAC, Detachment 4. This detachment acts as a MAC liaison to the Aeronautical Systems Division in all matters relating to the development of aircraft, avionics, material handling and related support systems for MAC.

Detachment 2, 136st Photographic Squadron. This detachment produces in-service motion pictures as directed by Headquarters Aerospace Audio-Visual Service and MAC, and operates a motion picture processing laboratory.

Detachment 2, 1401st Military Airlift Squadron. This detachment acts as the single manager for T-39 airlift on Wright-Patterson.

CHAPTER 3

ENVIRONMENTAL SETTING

CHAPTER 3
ENVIRONMENTAL SETTING

The environmental setting of Wright-Patterson Air Force Base is described in this chapter with the primary emphasis directed toward identifying features that may facilitate the movement of hazardous waste contaminants off base. Environmentally sensitive conditions pertinent to this study are highlighted at the end of this section.

METEOROLOGY

Temperature, precipitation, snowfall and other relevant climatic data furnished by Detachment 15, 15th Weather Squadron, Wright-Patterson Air Force Base are presented as Appendix C, Table C.1. The indicated period of record is 36 years. The summarized data indicate that the mean annual precipitation is 36.4 inches, part of which is and the mean annual snowfall of 25 inches. Bloyd (1974) reports that estimated annual lake evaporation for the Dayton area is approximately 33 inches.

GEOGRAPHY

The Dayton area lies within the Till Plains section of the Central Lowlands Physiographic Province (Fenneman, 1938). The regional land surface typically appears flat to gently rolling. Area streams and rivers have developed generally level floodplains such as the Mad River floodplain on which most of Wright-Patterson Air Force Base is situated.

Topography

Regional elevations of the Till Plains vary from 900 feet to 1,100 feet MSL. Area relief is generally the result of glacial activity during the last (Wisconsin) period of major glaciation which has covered area bedrock with a relatively thin veneer of glacial drift. Locally, relief may be very distinct due to the presence of deposits of unconsolidated materials in the form of such glacial landforms as kames

(irregular, rounded, sometimes dome-like hillocks of stratified drift) and terminal moraines (accumulations of glacial till pushed up by the glacier).

Surface elevations at Wright-Patterson Air Force Base vary from 800 feet MSL in Areas A and C, located within the Mad River Floodplain to 975 feet MSL at a point adjacent to Area B Building 620, which is located along the crest of the Mad River Valley.

Drainage

The study area is drained principally by the Mad River and its tributaries which encompass a total drainage area of some 635 square miles (Plummer, 1973). Drainage of base areas is accomplished by overland flow to small installation streams such as Mud Run, Hebble Creek and the small unnamed stream flowing along the southwest border of Area B. Installation streams conduct flow in a generally westward direction, terminating at the Mad River. Figure 3.1 depicts installation drainage features.

Surface Soils

Surface soils of Wright-Patterson Air Force Base have been mapped by the USDA, Soil Conservation Service (1976 and 1978). Most of the installation land area lying within the Mad River floodplain is mapped as "Modified or Urban Land". Soils of this unit have been altered, completely removed locally or have been buried as a result of base construction or individual site use modification projects. This unit overlies permeable coarse-grained alluvium and/or glacial deposits, and therefore, probably exerts severe constraints on the development of waste disposal facilities. Of the remaining nineteen soil units identified on base, nine exert severe constraints on waste disposal practices due to the permeability of materials comprising the unit, normally high water tables or flooding potential. Base soils data are summarized in Table 3.1 and soil units are presented in Figure 3.2 and 3.3.

GEOLOGY

The geology of the Dayton area has been reported by several investigators, including Stout et al, (1943), Norris and Spieker (1966) and has been mapped by Bownocker et al, (1920, reprinted 1981). A brief review of their work is provided to support this investigation. A

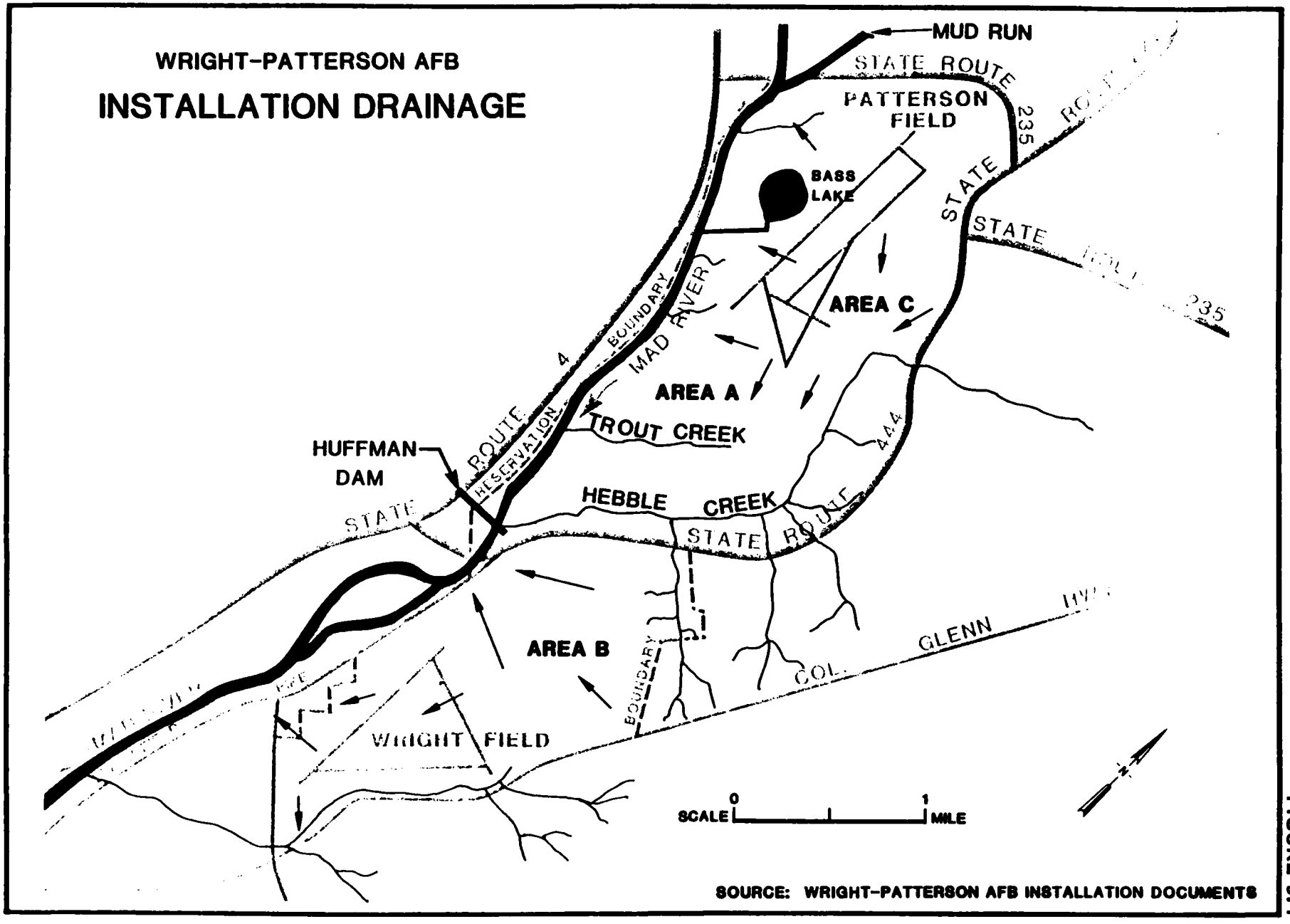

WRIGHT-PATTERSON AFB
INSTALLATION DRAINAGE
MUD RUN
STATE ROUTE
PATTERSON FIELD
235
BASS LAKE
STATE
AREA C
MAD RIVER
BOUNDARY
AREA A
TROUT CREEK
HUFFMAN DAM
ROUTE 4
RESERVATION
HEBBLE CREEK
444
STATE
STATE ROUTE
AREA B
BOUNDARY
GLENN
WRIGHT FIELD
SCALE 0 1 MILE
SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

FIGURE 3.1

TABLE 3.1

WRIGHT-PATTERSON AIR FORCE BASE SOILS

Map Symbol	Series	Slope percent	USDA Texture (major fraction)	Total Thickness (inches)	Unified Class. (major fraction)	Permeability (inches/hour)	Disposal Site Utilization (constraints)
CcD2	Casco-Eldean	12-18	Loam; clay loam Sandy clay loam Sand and gravel	60	ML CL GM,SM,GP, SP	0.6 to > 6.0	Severe-perm.
EmA	Eldean	0-2	Silt loam; silt clay loam	60	ML;CL	0.6 to > 6.0	Severe-perm.
EMB	Eldean	2-6	Gravelly clay; sandy		SM;GC		
EmB2	Eldean, mod. eroded	2-6	Gravelly loam; sand & gravel		GM,SM,GP,SP		
Ln	Linwood	none	Muck Silt loam, loam	60	Pt ML,CL	0.6 to 2.0	Severe-floods
MhB	Miamian	2-6	Loam; silt loam	60	CL,ML	0.2 to 2.0	Slight
MhC2	Miamian, mod. eroded	6-12	Clay loam		CL-ML		Moderate-slope
MlB	Miamian	2-6					Slightly
MlB2	Miamian, mod. eroded	2-6					Slightly
MoC2	Miamian-Eldean, moderately eroded	6-12					Moderate-slope
OcA	Ockley	0-2	Silt loam; silty clay loam;	60	ML, CL, SC	0.6 to >6.0	Severe-perm.
OcB	Ockley	2-6	Clay loam; gravity clay loam Sand and gravel		GM,SM,GP,SP		
Ra	Ragsdale	none	Silty clay loam; silt loam	96	CL,ML	.06 to 2.0	Severe-floods
RdB	Raub	2-6	Silty clay loam; silt loam Clay loam; loam	60	CL,ML CL-ML	.06 to 2.0	Moderate-high water table

TABLE 3.1 (CONTINUED)

Map Symbol	Series	Slope percent	USDA Texture (major fraction)	Total Thickness (inches)	Unified Class. (major fraction)	Permeability (inches/hour)	Disposal Site Utilization (constraints)
RhD	Ritchey	12-18	Silt loam; silty clay loam, clay, limestone bedrock	18	ML,CL,CH, CL-ML	0.6 to 2.0	Severe-shallow bedrock
RhE2	Ritchey, mod. eroded	18-25					
So	Sloan	none	Silt loam; clay loam Silty clay loam; sandy loam	60	CL,ML,SM	0.6 to 2.	Severe-floods
WaA	Warsaw	0-2	Loam; clay loam; clay Gravelly loam sand	60	ML,CL GM,SM,GP,SP	0.6 to >6.0	Severe-perm.
Ws	Westland	*none*	Silty clay loam; sandy loam Sand and gravel	60	ML-CL,CH,ML SM,GW-GM,GW,GP	0.6 to 12.0 +	Severe-high water table
*MuL	Modified or urban land	varies	varies	unknown	varies	not estimated	Probably severe**

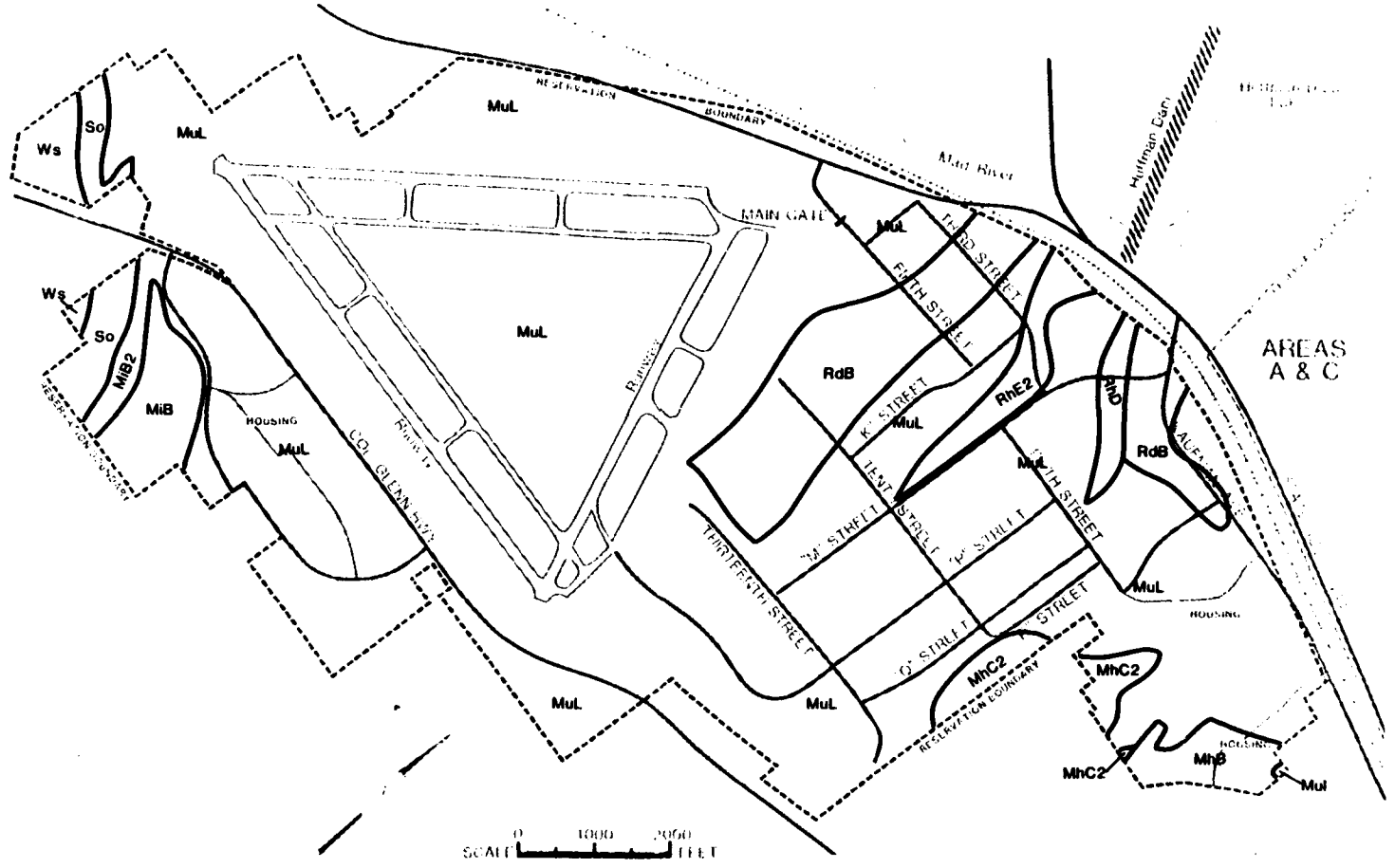
* Note: This unit, which encompasses most of the installation, incorporates several soil series which have been altered, removed, or buried by construction activities and related site use modifications.

**Probably severe due to location, local flooding potential or estimated permeability of underlying geologic unit.

Source: USDA Soil Conservation Service Reports, Montgomery County (1976) and Greene County 1978).

WRIGHT-PATTERSON AFB

SOIL ASSOCIATIONS - AREA B

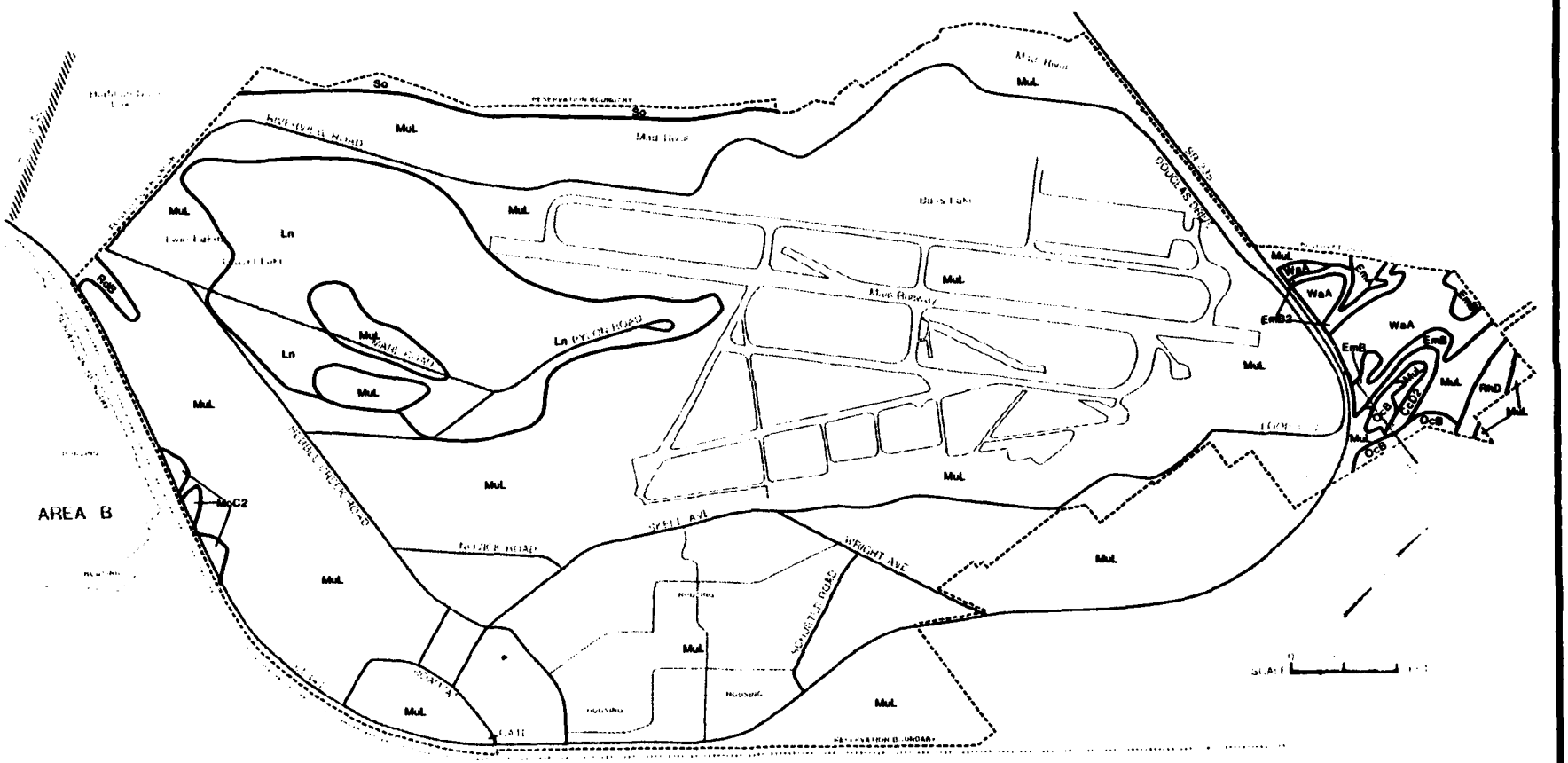


SOURCE: USDA SOIL CONSERVATION SURVEY (1976)

FIGURE 3.2

WRIGHT-PATTERSON AFB

SOIL ASSOCIATIONS - AREAS A & C



SOURCE: USDA SOIL CONSERVATION SURVEY (1978)

FIGURE 3.3

study area geologic map is presented as Figure 3.4 and depicts the distribution of significant geologic units relevant to this study. Geologic units ranging in age from Silurian to Ordovician have been described in the Dayton area and are presented in Table 3.2. A generalized geologic cross section extending down the Mad River Valley from Huffman Dam is included as Figure 3.5. The variability of the area precluded the preparation of a geologic cross section upstream from Huffman Dam for this study.

Consolidated Units

The consolidated rocks underlying Dayton area valleys and lowlands are represented by the Ordovician Age Richmond Group. The Richmond consists of some 265 feet of interbedded shales and limestones that crop out in portions of eastern Montgomery and western Greene Counties (Stout, et al, 1943).

Overlying the Richmond is the Silurian age Brassfield Limestone, which forms the walls of the Mad River valley. The Brassfield is identified as a relatively pure limestone, approximately thirty feet thick in the general study area (Norris and Spieker, 1966).

Study area hilltops and uplands are formed by a 230-foot thick sequence of silurian age Niagara Group shales, limestones and dolomites.

Glacial Deposits

Pleistocene age unconsolidated materials are represented in the study area by till and outwash deposits. These materials were deposited during the last (Wisconsin) period of major glaciation and are present throughout the study area overlying bedrock units. Glacial deposits are particularly significant as they form the major regional aquifers.

Glacial Till

Glacial till (moraines), consisting of a heterogeneous mixture of cobbles, gravel, sand, silt and clay, was deposited directly by the glacier as it moved over the region. The till is generally interbedded with water-bearing sand and gravel zones and locally may form aquitards, confining aquifers or limiting recharge to underlying unconsolidated aquifers. In many areas, the till or moraines were buried by outwash sand and gravel and remain in their original form (Norris and Spieker, 1966).

TABLE 3.2

GENERALIZED BEDROCK STRATIGRAPHY

System	Group	Formation	Character of Material	Water-Bearing Properties	Average Thickness (feet)
Silurian	Niagara	Cedarville dolomite	Massive, porous	Generally good water supplies available for farm and domestic requirements, except from the Osgood shale. Wells ordinarily yield from 6 to 15 gpm. A few wells yield from 100 to 200 gpm. Water very hard. Important spring horizon at base of system.	50+
		Springfield dolmoite	Well-bedded, dense		14
		Euphemia dolomite of Foerste	Massive, porous		8
		Laurel dolomite	Well-bedded, dense		5
		Osgood formation	Shale, calcareous, with limestone beds		15
		Dayton limestone	Limestone or dolomite well-bedded, dense		8
	Clinton	Brassfield limestone	Fossiliferous, massive to irregularly bedded		30
Ordovician	Richmond Maysville Eden Group, Undifferentiated		Shale, soft, calcareous interbedded with thin hard limestone layers; called Cincinnati shale in old reports.	Wells generally yield no water, or seldom more than 1 gpm. Water is sometimes highly charged with iron or salt compounds. Where water is present it generally occurs in top few feet of strata.	980
	Pre-Eden	Trenton limestone	Limestone or dolomite with some shale.	Generally yields salt water at base	500

Source: Modified from Plummer (1973).

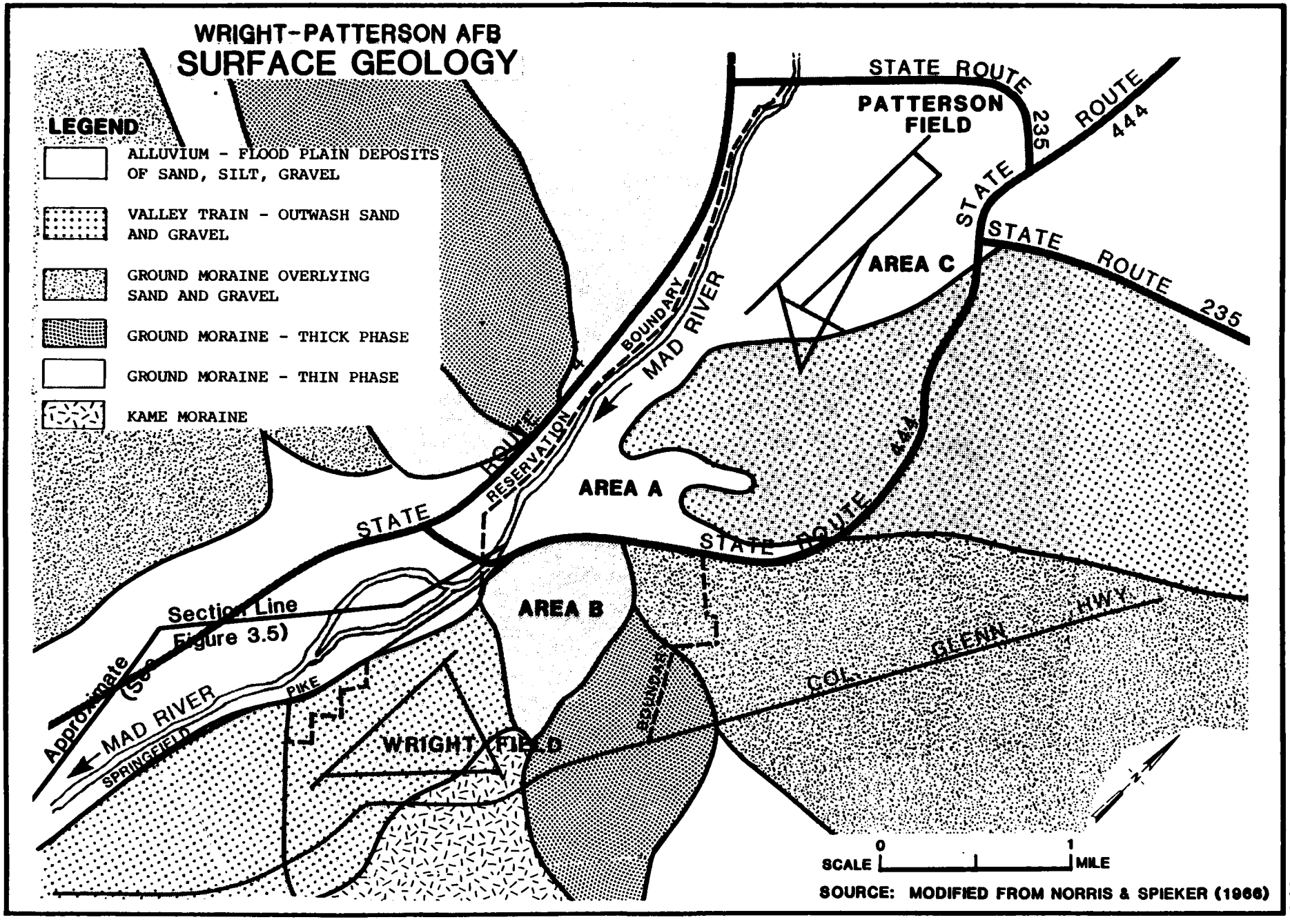
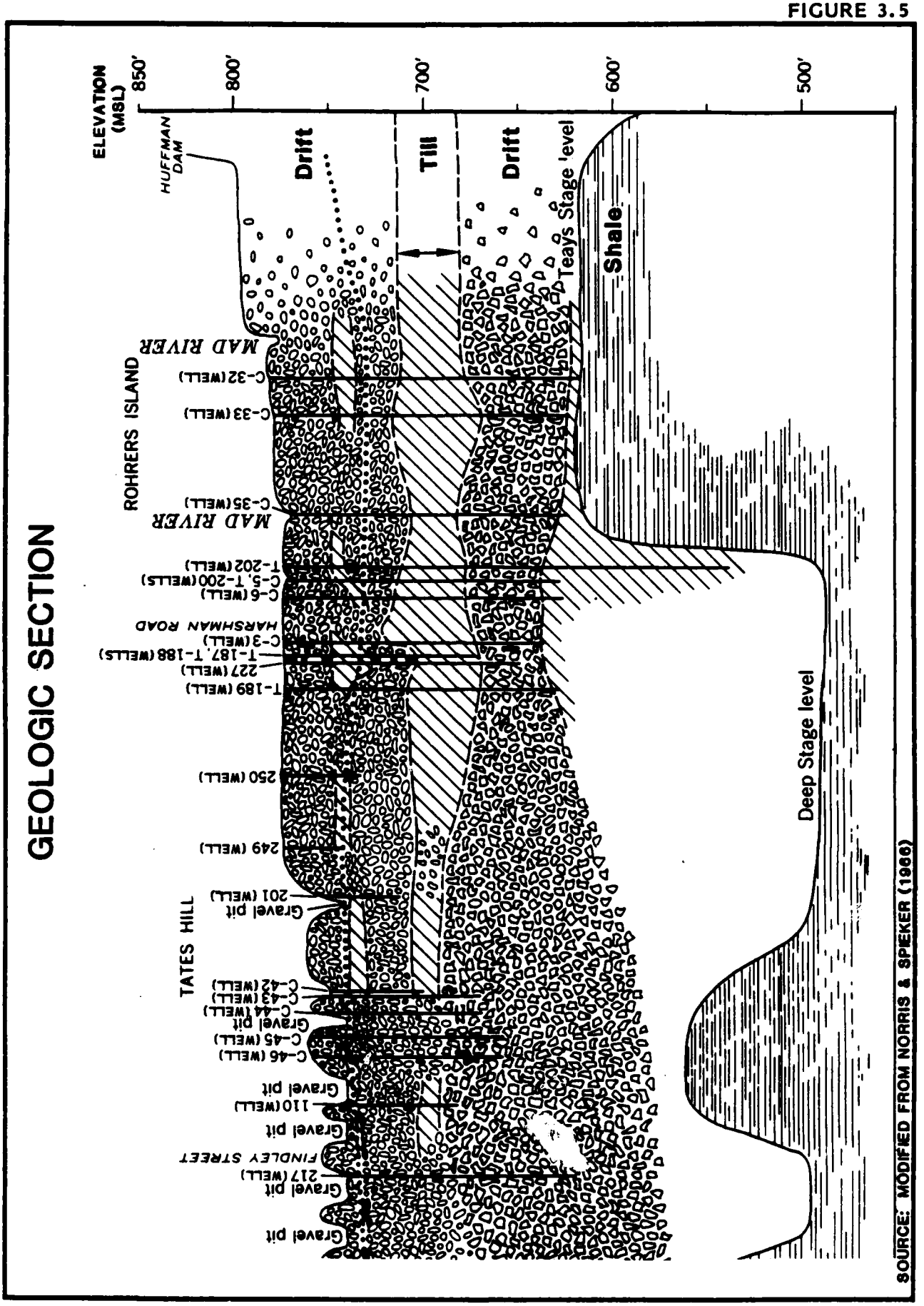

WRIGHT-PATTERSON AFB
SURFACE GEOLOGY
LEGEND
ALLUVIUM - FLOOD PLAIN DEPOSITS OF SAND, SILT, GRAVEL
VALLEY TRAIN - OUTWASH SAND AND GRAVEL
GROUND MORAINE OVERLYING SAND AND GRAVEL
GROUND MORAINE - THICK PHASE
GROUND MORAINE - THIN PHASE
KAME MORAINE
STATE ROUTE 235
PATTERSON FIELD
ROUTE 444
STATE ROUTE 235
AREA C
BOUNDARY
MAD RIVER
RESERVATION
ROUTE 444
AREA A
STATE ROUTE
STATE ROUTE
Section Line
Figure 3.5)
AREA B
HWY
GLENN
COL
PIKE
MAD RIVER
SPRINGFIELD
WRIGHT FIELD
SCALE 0 1 MILE
SOURCE: MODIFIED FROM NORRIS & SPIEKER (1966)

FIGURE 3.4

FIGURE 3.5


GEOLOGIC SECTION
ELEVATION (MSL)
850'
800'
700'
600'
500'
HUFFMAN DAM
Drift
Till
Drift
Teays Stage level
Shale
MAD RIVER
ROHRERS ISLAND
C-32 (WELL)
C-33 (WELL)
C-35 (WELL)
MAD RIVER
T-202 (WELL)
C-5, T-200 (WELLS)
C-6 (WELL)
HARSHMAN ROAD
C-3 (WELL)
T-187, T-188 (WELLS)
227 (WELL)
T-189 (WELL)
250 (WELL)
249 (WELL)
201 (WELL)
Gravel pit
TATES HILL
C-42 (WELL)
C-43 (WELL)
C-44 (WELL)
Gravel pit
C-45 (WELL)
C-46 (WELL)
Gravel pit
110 (WELL)
Gravel pit
FINDLEY STREET
217 (WELL)
Gravel pit
Gravel pit
Deep Stage level
SOURCE: MODIFIED FROM NORRIS & SPIEKER (1966)

Outwash

As the glacier retreated, melt streams flowing through the valleys and lowlands deposited large accumulations of sand and gravel identified commonly as outwash or valley train deposits. Outwash deposits attain a maximum thickness of 250 feet at Dayton and usually over lie till deposits (Norris and Spieker, 1966). Outwash deposits form the most prolific aquifer of the Ohio region (Bloyd, 1974).

Recent Alluvium

Recent age alluvium, deposited in relatively thin sequences by modern streams, typically overlies the outwash deposits. The alluvium is present at ground surface adjacent to all major streams and consists of both sorted and unsorted accumulations of sand, silt, gravel and clay.

HYDROLOGY

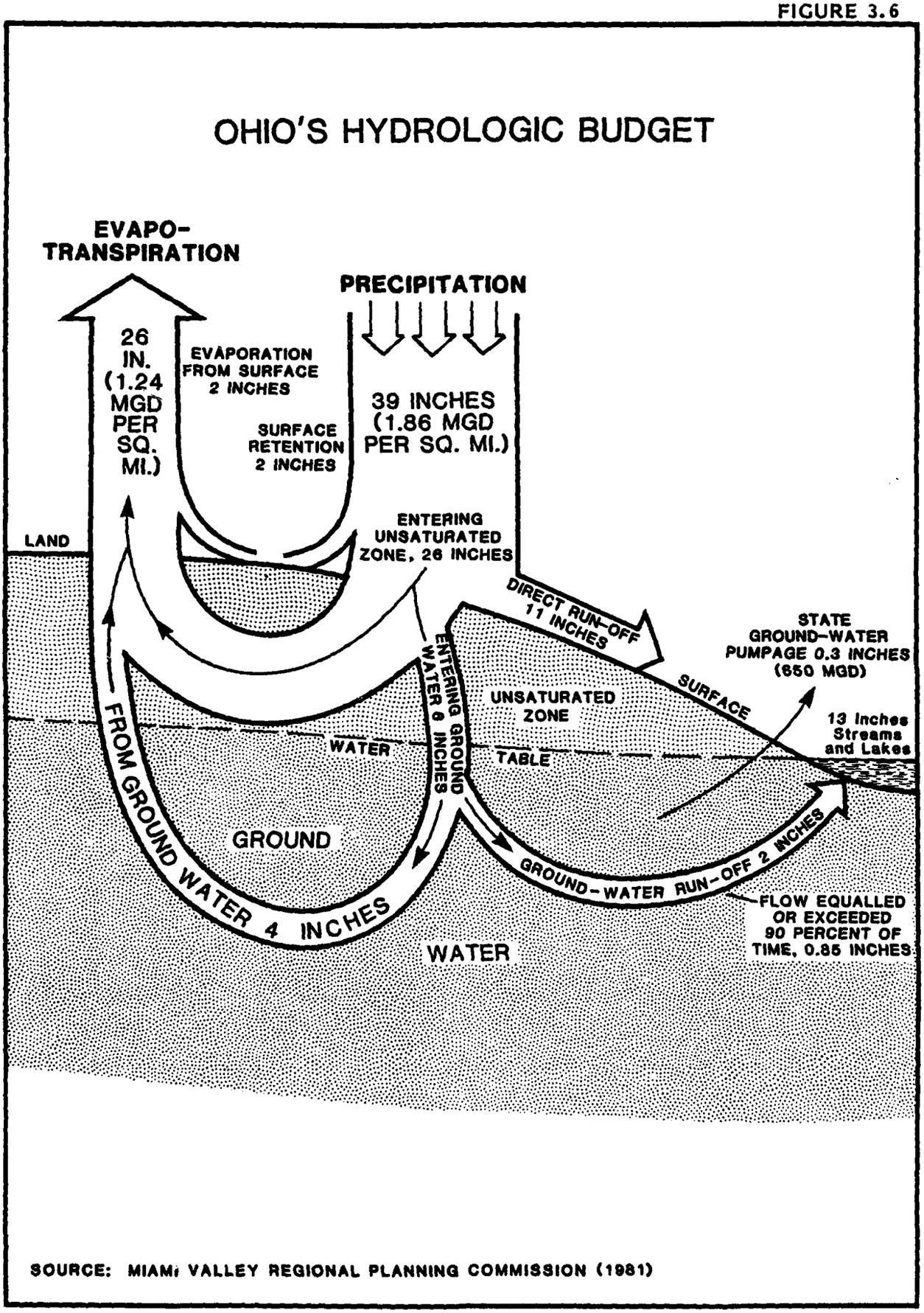
Introduction

Ground water hydrology of the Wright-Patterson Air Force Base area has been reported by Norris (1959), Spieker (1968), Norris and Spieker (1966) and Bloyd (1974). Additional information has been obtained from Eagon (1979) and The Miami Valley Regional Planning Commission (1981).

Wright-Patterson AFB lies within the Ohio ground water resource region (Bloyd, 1974). Ground water resources of the region are typically derived from unconsolidated sediments of glacial origin which function as an integral member of the area's hydrologic cycle, depicted on Figure 3.6. The major sources of recharge to local aquifers consist of precipitation, stream flow infiltration and artificial methods. Precipitation, falling directly on the unsaturated portion of an aquifer, or a communicating unit in contact with the aquifer, provides an important source of ground water recharge. Infiltration of stream waters through stream beds to aquifers below may provide an important source of recharge, especially in areas where pumping has altered ground water conditions locally.

In reviewing other reports, Norris and Spieker (1966) note that pumping from installation wells has induced infiltration through the bed of Hebble Creek at rates ranging from 0.17 to 0.33 million gallons per day per acre and through the bed of Mud Run at 0.34 million gallons per

FIGURE 3.6



SOURCE: MIAMI VALLEY REGIONAL PLANNING COMMISSION (1981)

day per acre. Because these rates were derived from low flow data, it is assumed that induced recharge values will increase during high flow periods.

Artificial recharge, such as that practiced at the Dayton Municipal Wellfield (Rohrers Island) adjacent to Wright-Patterson Air Force Base provides significant supplies of surface water via infiltration ponds to producing aquifers. In this case, an engineered recharge facility is utilized to supplement ground water recharge and stabilize water levels. Figure 3.7 depicts the Rohrers island facility. Due to the environmental setting of the base and the diversity of ground water recharge types prevalent in the study area, most of the Wright-Patterson Air Force Base land area is a recharge zone.

Hydrologic Units

Several distinct hydrologic units are present in the general study area and are mapped as Figure 3.8. The units are typically of glacial origin with the exception of recent alluvium. A brief description of each unit is presented below:

1. Alluvium. Recent alluvial sediments, deposited as a result of modern stream development are presented in stream channels and along floodplains. The sediments consist of poorly sorted to well sorted sand, gravel, silt and clay-sized particles. The unit may vary in thickness from a few feet at small streams to tens of feet in stream channels such as that of the Mad River. Because of its relative youth, recent alluvium locally overlies the outwash (valley train) deposits, glacial till and moraine sediments. Ground waters occur in this unit under water table (unconfined) conditions. Although moderate supplies of ground water may be derived from this unit (100-500 gallons per minute), normal practice for the Ohio area dictates that this unit be penetrated and that water supplies be obtained from the more productive underlying outwash units. At Wright-Patterson Air Force Base, this unit is typically forty to sixty feet thick, where present. The alluvial aquifer is significant to this study as it may provide base flow to streams locally during low flow periods.

2. Outwash (Valley Train). Outwash materials, deposited by the retreating glaciers have partially or completely filled the valleys carved by the glacier's advance. At Wright-Patterson AFB, outwash is

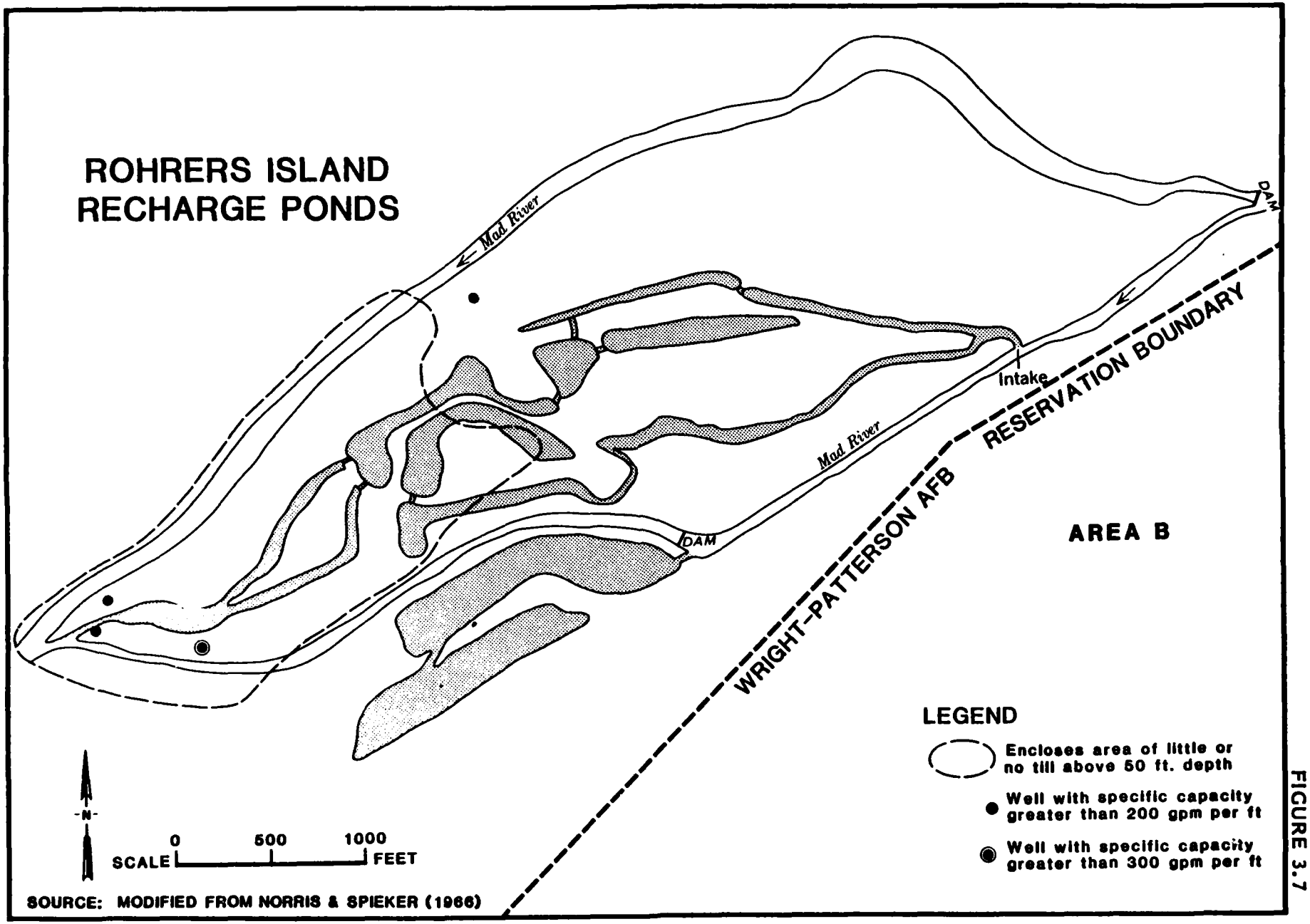
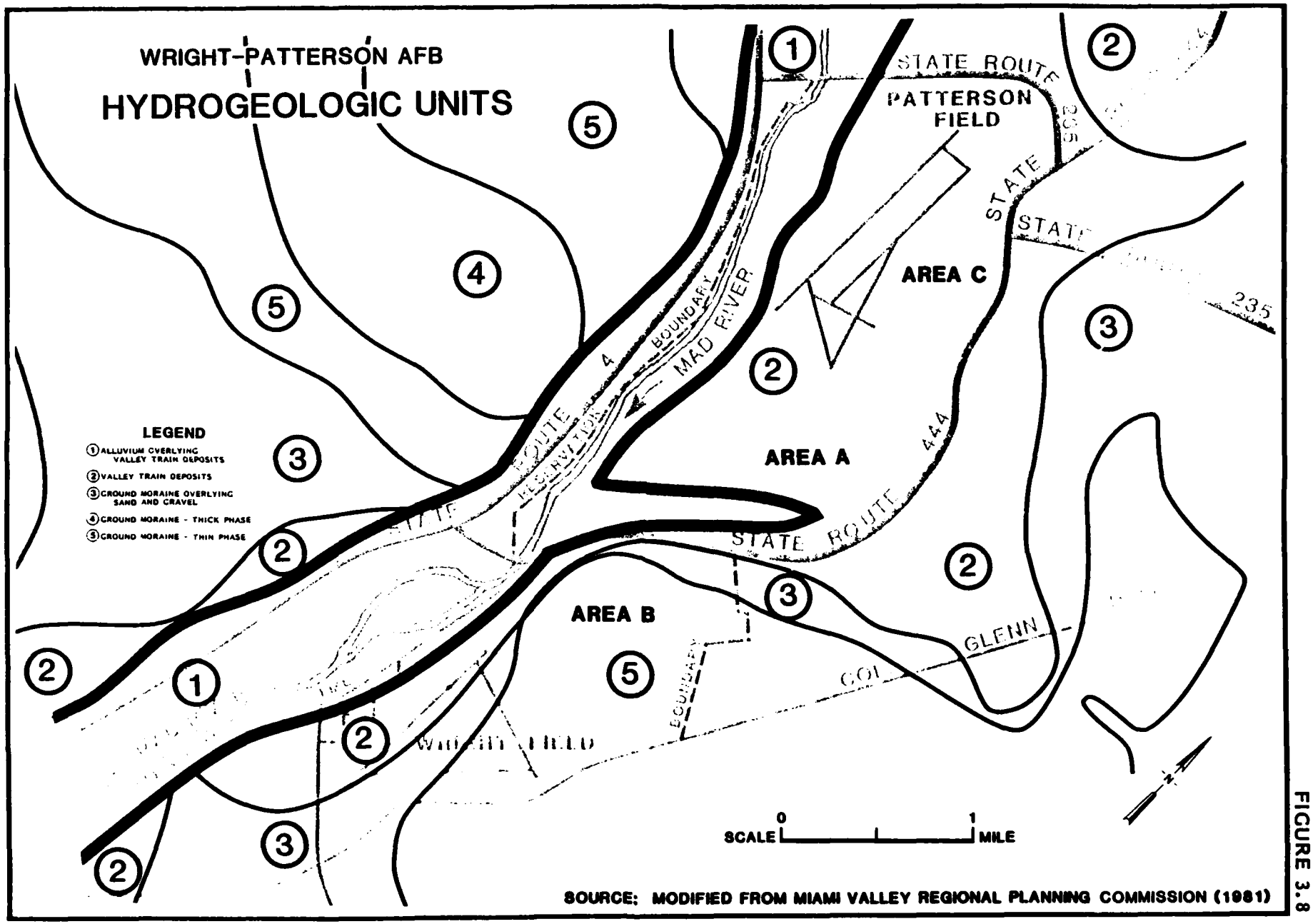

ROHRERS ISLAND
RECHARGE PONDS
Mad River
DAM
Intake
Mad River
DAM
AREA B
WRIGHT-PATTERSON AFB
RESERVATION BOUNDARY
LEGEND
Encloses area of little or no till above 50 ft. depth
Well with specific capacity greater than 200 gpm per ft
Well with specific capacity greater than 300 gpm per ft
N
0
500
1000
SCALE
FEET
SOURCE: MODIFIED FROM NORRIS & SPIEKER (1966)

FIGURE 3.7



SOURCE: MODIFIED FROM MIAMI VALLEY REGIONAL PLANNING COMMISSION (1981)

FIGURE 3.8

locally separated from overlying alluvial materials by a two foot (Well 4) to seventeen foot (Well 8) thickness of dense, unsorted till composed of clay, silt, gravel and sand. In many areas, the isolating till layer is thin or absent. Leakage of the till has been quantified by Norris (1959). At Rohrers Island, the outwash deposits average fifty feet in thickness and form the region's most productive aquifer, with yields on the order of 1000+ gallons per minute. At the base, the transmissivity of this unit ranges from 275,000 to 400,000 gpd/ft, indicative of a very productive aquifer (Eagon, 1979). This unit is tapped by Wright-Patterson Air Force Base, and is the primary unit from which municipal supplies are drawn at the nearby Dayton wellfield on Rohrers Island. Ground water occurs in this unit under both water table (unconfined) and artesian (confined) conditions. This unit may provide base flow to streams locally during lowflow conditions in areas where it exists at or near the ground surface.

3. Moraine. Moraine deposits, somewhat variable accumulations of glacial sediments, may contain moderate supplies of water under typically water table conditions in coarse sand and gravel zones. This unit varies in thickness from five to seventy feet. Low yields on the order of 25 gallons per minute have been reported, although normally, only domestic quantities are obtained and in some cases, supply may be unreliable. Where this unit overlies more permeable zones, the lower unit is normally tapped for water supplies.

4. Glacial drift - thick phase. Ground water contained under water table conditions in the scattered sand and gravel sequences of this unit may provide domestic supplies on the order of ten gallons per minute. The unit is generally greater than twenty feet thick and may overlie units of greater productivity.

5. Glacial drift - thin phase. Small ground-water supplies existing under water table conditions may be derived from buried sand and gravel layers or from underlying bedrock. This unit is generally twenty feet thick or less and is absent where bedrock crops out. Typically, only small supplies of ground water on the order of five gallons per minute may be obtained from this unit.

The outwash (valley train) aquifer is the most extensively exploited regional aquifer, and for this reason, a substantial amount of

information has been developed relative to the unit. A piezometric surface map depicting ground water flow directions in the outwash aquifer is presented as Figure 3.9. It is presumed that the piezometric surfaces of other aquifers in the study area roughly mirror ground surface and that topography exhibits local control over ground water system movement. In general, it may be stated that ground water flow in upland unconsolidated hydrogeologic units is downslope; in lowland or stream-valley hydrogeologic units, ground-water flow is presumed to be down-valley. A large drawdown feature has developed in the vicinity of the Dayton Municipal Wellfield (Rohrers Island) which reflects continuous heavy pumpage. Ground water flows north of Wright Field may have been altered by this activity as flow directions and velocities have probably been changed locally.

Base Water Supplies

Wright-Patterson Air Force Base currently obtains its water resources from installation operated wells. All installation water wells are finished in the outwash (valley train) aquifer. Base well locations are depicted on Figure 3.10. Base wells now in service average 55 feet in depth. Figure 3.11 depicts the construction of a typical base well. Base well construction information is summarized in Appendix C, Table C.2. Static water levels range from 5 feet at Well No. 6 to 22 feet at Well No. 3 and No. 7 (below ground surface). The relatively high yields and low drawdowns observed in base wells indicate a very productive and permeable aquifer.

Several studies have been performed in recent years by Plummer (1973), Evans (1977) and the Miami Valley Regional Planning Commission (1981) that focus upon the impact of waste disposal on ground-water quality. All appear to have concluded that regional water quality may be degraded by waste disposal. Evans (1977) has mapped ground-water quality within the outwash (valley train) aquifer of the Mad River Valley. This work indicates that high (300-1000 ug/l) iron concentrations, high dissolved manganese levels (>200 ug/l) and moderate total organic carbon levels (3.0-9.9 mg/l) were observed in water derived from the outwash aquifer adjacent to Wright-Patterson AFB. The area of water quality degradation has been mapped into installation outwash aquifer zones also.

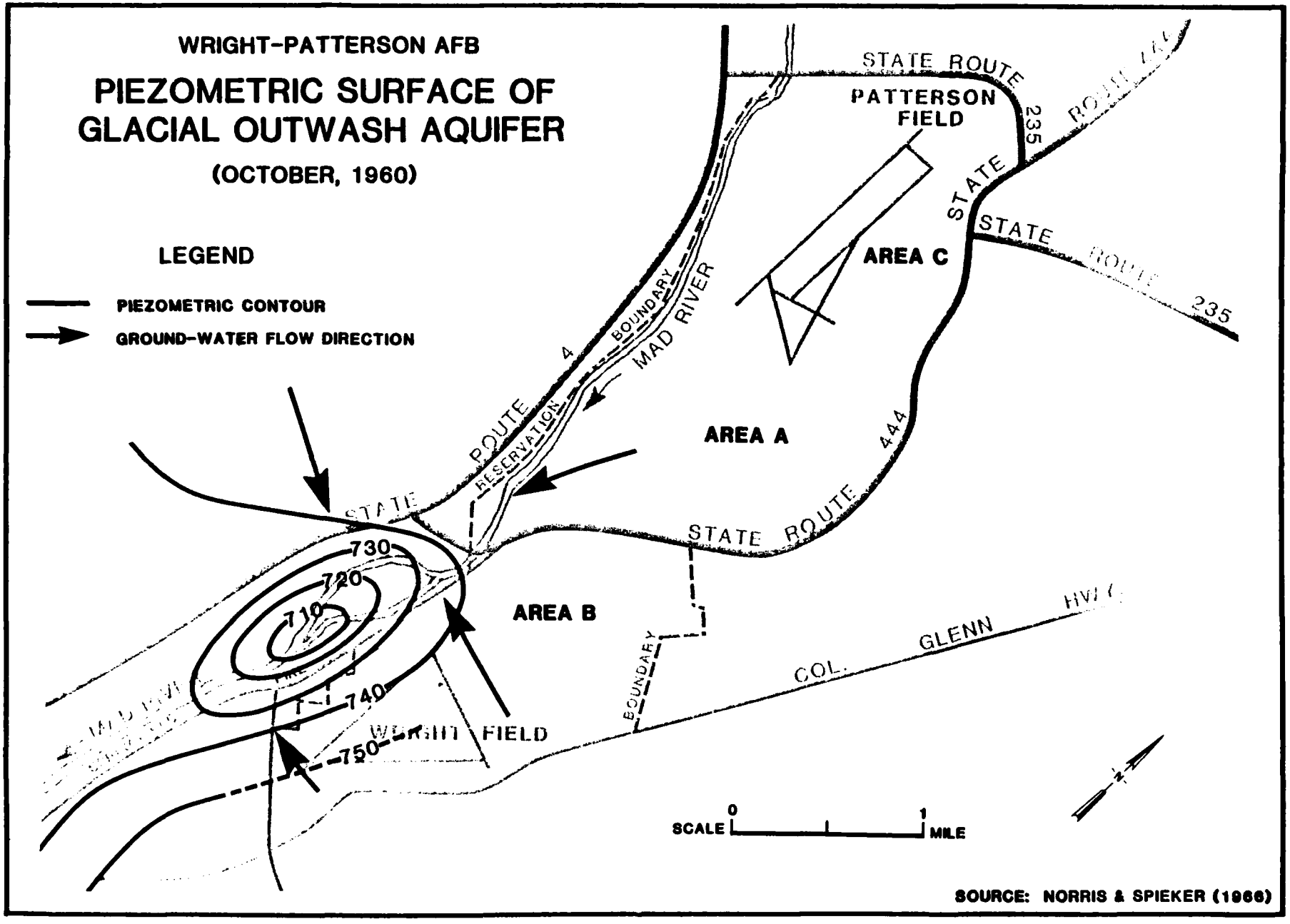

WRIGHT-PATTERSON AFB
PIEZOMETRIC SURFACE OF GLACIAL OUTWASH AQUIFER
(OCTOBER, 1960)
LEGEND
PIEZOMETRIC CONTOUR
GROUND-WATER FLOW DIRECTION
STATE ROUTE
PATTERSON FIELD
235
STATE
STATE ROUTE 235
AREA C
4
BOUNDARY
MAD RIVER
AREA A
444
STATE ROUTE
730
720
710
AREA B
740
750
WRIGHT FIELD
BOUNDARY
COL. GLENN
SCALE 0 1 MILE
SOURCE: NORRIS & SPIEKER (1966)

FIGURE 3.9

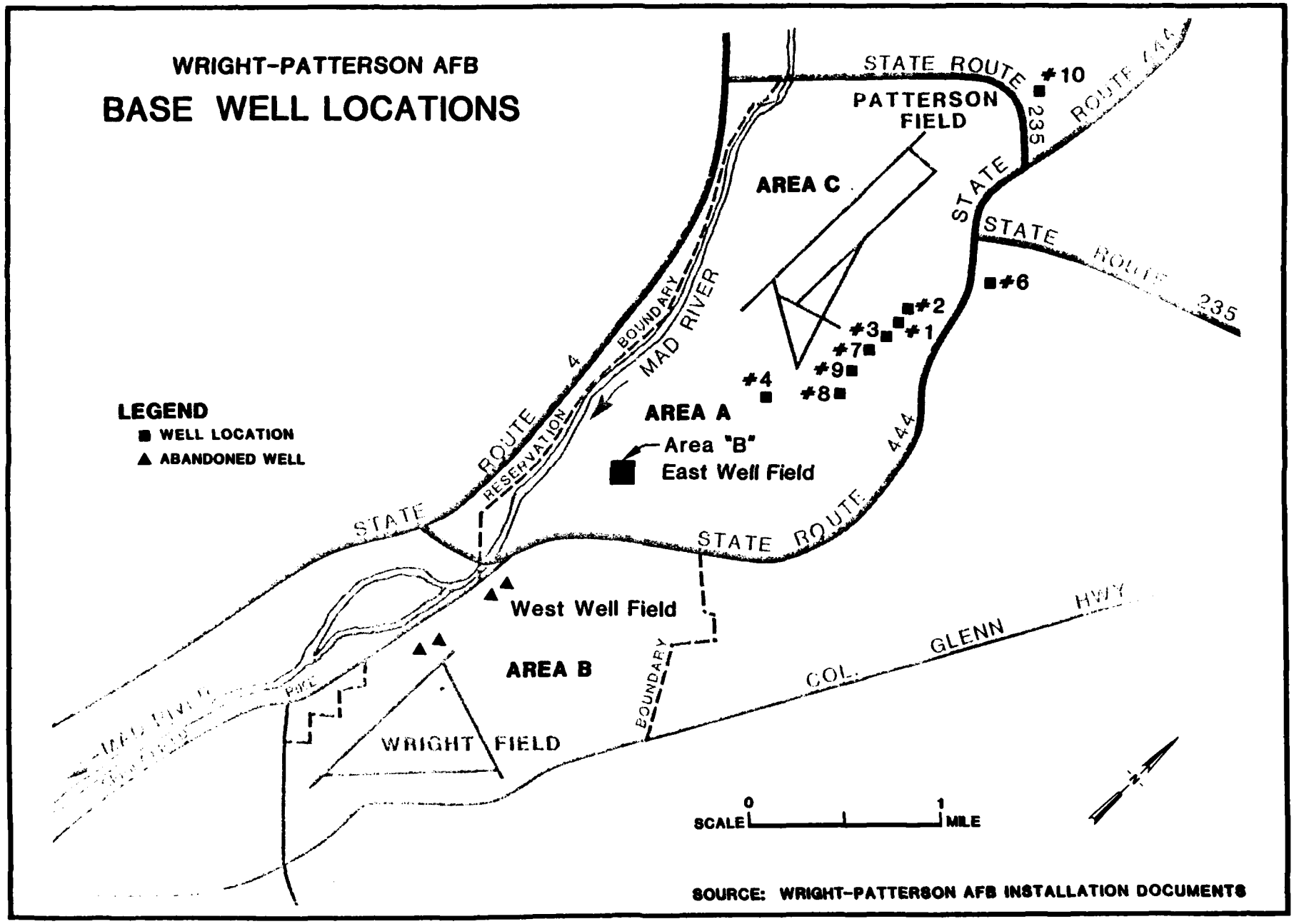
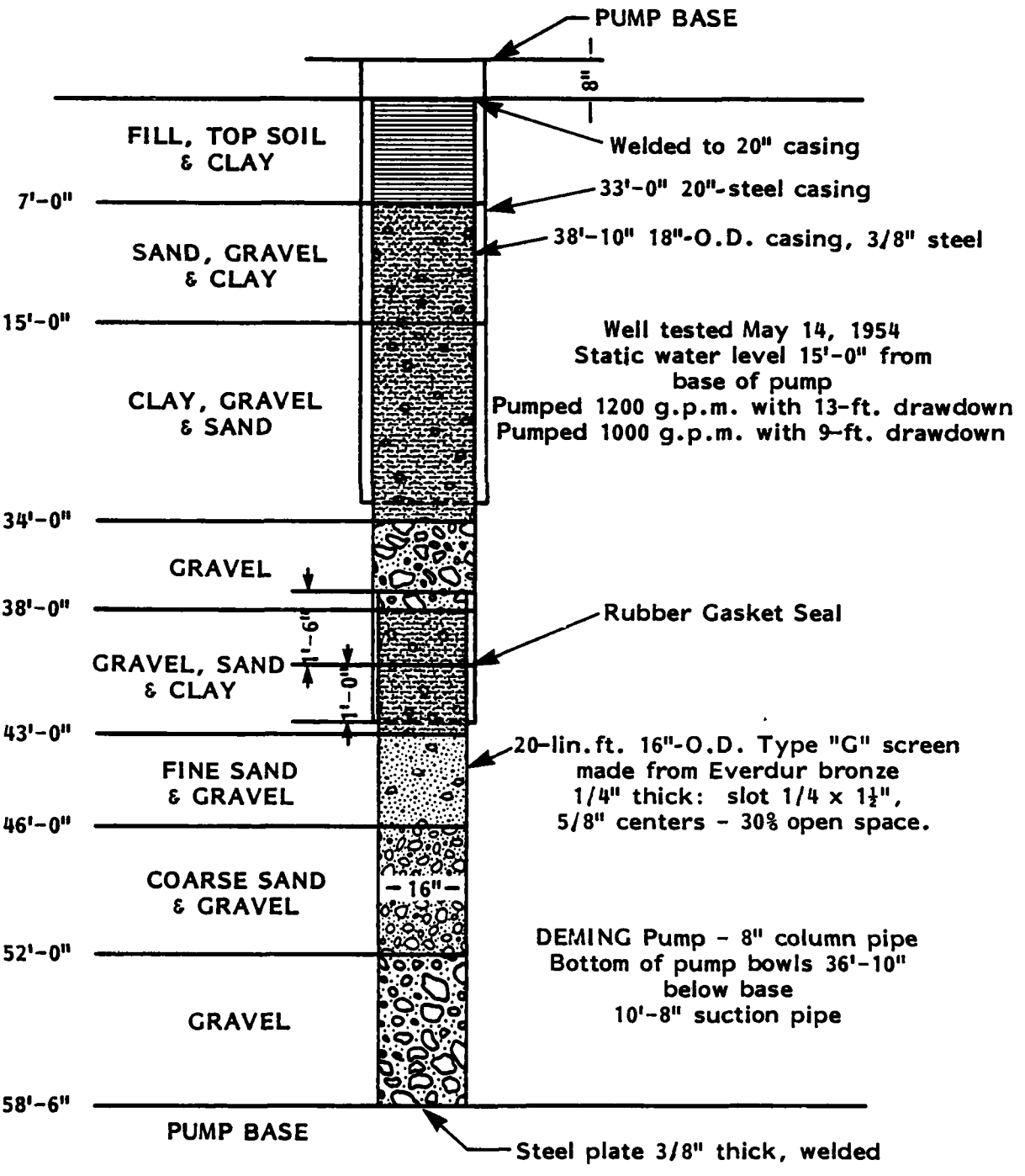

WRIGHT-PATTERSON AFB
BASE WELL LOCATIONS
STATE ROUTE 444
PATTERSON FIELD
#10
235
STATE ROUTE 235
AREA C
#6
#2
#3
#1
#7
#9
#4
#8
MAD RIVER
BOUNDARY
4
LEGEND
WELL LOCATION
ABANDONED WELL
AREA A
Area "B"
East Well Field
STATE ROUTE 444
STATE
RESERVATION
STATE ROUTE
West Well Field
AREA B
WRIGHT FIELD
BOUNDARY
COL. GLENN HWY
SCALE 0 1 MILE
N
SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

FIGURE 3.10

WRIGHT-PATTERSON AFB

REBUILT WELL NO. 7



SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

Surface Water

The Ohio Environmental Protection Agency has regulatory authority for the maintenance of water quality which includes surface waters on and adjacent to Wright-Patterson AFB. The State's Water Quality Standards set forth the authority for the assignment of stream classifications for all state waters. The standards are summarized as follows:

> Mad River - Adjacent to WPAFB is designated for Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreation.
>
> Mad River Above Huffman Dam - Governed by the Antidegradation Policy to assure preserving the water quality for the Huffman Recreation Area.

Wright-Patterson AFB has an NPDES permit which expires June 30, 1983 which regulates the discharge of surface runoff to the Mad River directly through five outfalls and through one outfall to Hebble Creek and then to the Mad River. Sampling of the outfalls is conducted by the Base Bioenvironmental Engineer with the results forwarded to the Ohio EPA in Columbus.

Summary of Environmental Setting

Geographical, geologic and hydrologic data evaluated for this study indicate the following:

- The Wright-Patterson area experiences moderate amounts of precipitation and snowfall annually.
- Base soils are typically permeable sands and gravels of glacial origin.
- The primary regional aquifer, outwash (valley train) sediments underlies the base at shallow depth (25 to 50 feet).
- Wright-Patterson Air Force Base and the City of Dayton obtain potable water supplies from the outwash (valley train) aquifer.
- Other unconsolidated water-bearing units are present on base or exist in proximity to the base.
- Ground water system recharge depends in part upon or has been induced from the flow of base streams (Mud Run and Hebble Creek).

The above points indicate that the potential for migration of contamination to area aquifers is high due to their characteristic high permeabilities and transmissivities. The primary receptors of migrating waste contamination would be local surface waters and local aquifers.

There are no known threatened or endangered plant or animal species residing on Wright-Patterson AFB. Some transient species may pass through the base on occasion.

Storm water runoff from the base drains to perennial and intermittent streams which discharge to the Mad River.

CHAPTER 4

FINDINGS

CHAPTER 4
FINDINGS

To assess hazardous waste management at Wright-Patterson Air Force Base, past activities of waste generation and disposal methods were reviewed. This section summarizes the hazardous waste generated by activity, describes waste disposal methods, and identifies and evaluates the disposal sites located on the base. Figure 4.1 presents the decision-tree methodology used in the review of waste practices. This methodology provides a logical algorithm for the consistent evaluation of all base practices.

PAST SHOP, LABORATORY AND BASE ACTIVITY REVIEW

To determine past base activities that resulted in generation and disposal of hazardous waste, a review was conducted of current and past waste generation and disposal methods. This review consisted of interviews with base employees, a search of files and records, and site inspections.

All hazardous waste that is generated on Wright-Patterson AFB can be associated with one of the following activities:

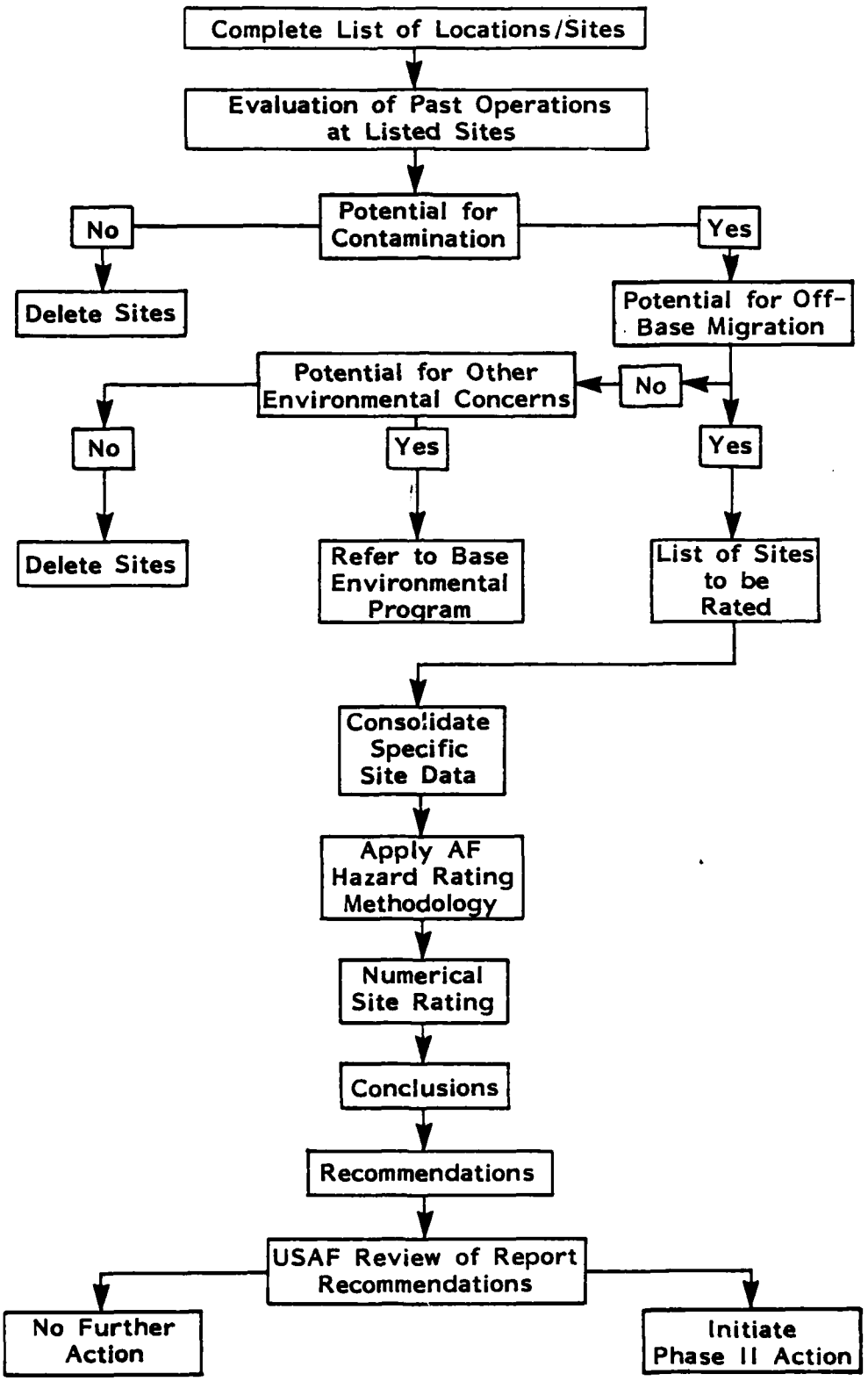
- Industrial shops
- Research and development laboratories
- Pesticide and herbicide utilization
- Radioactive wastes
- Fuel management
- Fire control training
- Hazardous waste storage
- Central heating plants

The following discussion addresses only those wastes generated on base which are either hazardous or potentially hazardous. In this discussion, a hazardous waste is defined as hazardous by either the Resource Conservation and Recovery Act (RCRA), or the Wright-Patterson

FIGURE 4.1

PHASE I INSTALLATION RESTORATION PROGRAM

DECISION TREE



documents which have been reviewed. A potentially hazardous waste is one which is suspected of being RCRA hazardous although insufficient data are available to fully characterize the waste material.

Industrial Shops

Major mission support activities are conducted at Wright-Patterson AFB by various groups, squadrons and recently contract organizations, who operate the industrial shops. These shops fabricate, maintain and repair components for aircraft and ground equipment. A list of industrial shops was obtained from the Environmental Planning Section and served as a starting point for the review of past waste generation and disposal practices. This list was derived from the base Spill Prevention Control and Countermeasures Plan (SPCC) and contained those shops where toxic/hazardous materials are used, stored, treated or disposed on-base. Additional shops, which presently exist or existed in the past, were added to the list as a result of interviews with base personnel. A list of shops is presented in Appendix D, which handled hazardous materials or generated hazardous wastes.

Shops which may pose a potential for ground or surface water contamination were selected for further review and investigation. Eleven shops were visited and an additional 20 shops were selected for telephone interviews. Information obtained from these interviews included hazardous waste compounds handled, waste quantities and disposal methods for each shop. Summarized results of the detailed shop reviews are listed in Table 4.1. The table indicates the shop, building location, hazardous waste generated, waste quantities and the disposal methods indexed to a timeline. The industrial shops presented in Table 4.1 are those which are significant either because of the quantity or type of hazardous waste generated or unique disposal method utilized.

Base personnel reported that since approximately 1973 all hazardous wastes were containerized for contractor pick-up arranged by the Civil Engineering Squadron (CE). Waste oils and fuels were collected from storage tanks by a truck dispatched by CE. These waste oils and fuels were temporarily stored in underground tanks until sufficient quantities were accumulated to warrant contract removal coordinated by DPDO. Prior to 1973, CE was directly responsible for the collection and disposal of hazardous wastes. Large quantities of waste oil, fuels and solvents

TABLE 4.1

INDUSTRIAL OPERATIONS (Shops)

WASTE GENERATIONS

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY*	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 – 1960 – 1970 – 1980)
4950th TEST WING FABRICATION & MODIFICATION DIVISION				
METAL CLEANING AND PLATING SHOP	5-AREA B	NITRIC AND SULFURIC ACID SOLUTION	200 GALS./5 YRS.	NEUTRALIZED TO SURFACE WATERS → CONTRACTOR DISPOSAL → NEUTRALIZED TO SANITARY SEWER
		CAUSTIC SODA AND TRISODIUM PHOSPHATE	1,000 GALS./4 MOS.	NEUTRALIZED TO SANITARY SEWER
		NITRIC ACID	340 GALS./6 MOS.	NEUTRALIZED TO SURFACE WATERS → CONTRACTOR DISPOSAL → NEUTRALIZED TO SANITARY SEWER
		SULFURIC ACID	60 GALS./6 MOS.	NEUTRALIZED TO SURFACE WATERS → CONTRACTOR DISPOSAL → NEUTRALIZED TO SANITARY SEWER
		NICKEL ACETATE	400 GALS./2 YRS.	BASE LANDFILL → CONTRACTOR DISPOSAL
		CADMIUM OXIDE POWDER, SODIUM CYANIDE, AND CAUSTIC SODA	480 GALS./YR.	BASE LANDFILL → CONTRACTOR DISPOSAL
		TRICHLOROETHYLENE (TCE)	110 GALS./YR.	BURNED ON-BASE → BASE LANDFILL → CONTRACTOR DISPOSAL
		TCE DEGREASER SLUDGE	1/4 DRUM/YR.	BASE LANDFILL → CONTRACTOR DISPOSAL
ELECTRONICS SHOP	5-AREA B	FERRIC CHLORIDE	50 GALS./3 MOS.	SANITARY SEWER → CONTRACTOR DISPOSAL
MODEL SHOP	5-AREA B	ACETONE	100 GALS./YR.	BURNED ON-BASE → CONTRACTOR DISPOSAL
PAINT SHOP	5-AREA B	PAINT STRIPPERS, CONTAMINATED THINNERS, WASTE PAINT	55 GALS./YR.	BASE LANDFILL → CONTRACTOR DISPOSAL
MODIFICATION BRANCH	206-AREA C (9-AREA B PRIOR TO 1973)	WASTE OILS, HYDRAULIC FLUIDS	50-75 GALS./MO.	BURNED ON-BASE → DPDO

KEY

———— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

*BASED ON CURRENT RATES AND BEST ESTIMATES OF PAST RATES

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

WASTE GENERATIONS

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY*	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 / 1960 / 1970 / 1980)
4950th TW FIELD MAINT. SQ				
METAL PROCESSING SHOP (PLATING AND WELDING)	13-AREA C	TRICHLOROETHYLENE	10 GALS./6 MOS.	BURNED ON-BASE → BASE LANDFILL → CONTRACTOR DISPOSAL
		SODIUM HYDROXIDE	350 GALS./3 MOS.	SANITARY SEWER
		CADMIUM OXIDE POWDER, SODIUM CYANIDE, CAUSTIC SODA	100 GALS./4 MOS.	BASE LANDFILL → CONTRACTOR DISPOSAL
		NITRIC ACID	20 GALS./YR.	NEUTRALIZED TO SURFACE WATERS → CONTRACTOR DISPOSAL
		HYDROCHLORIC ACID	20 GALS./YR.	NEUTRALIZED TO SURFACE WATERS → CONTRACTOR DISPOSAL
AIRCRAFT WHEEL AND RELATED COMPONENTS CLEANING ROOM AND PAINT SHOP	13-AREA C	PAINT REMOVER	1,400 GALS./YR.	BASE LANDFILL → DPDO
		CARBON REMOVER, PD-680, HYDRAULIC FLUID, PAINT THINNER	700 GALS./YR.	BASE LANDFILL → DPDO
NON-DESTRUCTIVE INSPECTION (NDI) LAB	13-AREA C (256-AREA C PRIOR TO 1971)	PENETRANT	400 GALS./YR.	BURNED ON-BASE → DPDO
		EMULSIFIER	400 GALS./YR.	BURNED ON-BASE → DPDO
		PHOTOGRAPHIC FIXER	60 GALS./YR.	SILVER RECOVERY TO SANITARY SEWER
JET ENGINE SHOP	13-AREA C	WASTE OIL, HYDRAULIC FLUID	100 GALS./MO.	BURNED ON-BASE → DPDO
PNEUDRAULIC SHOP	13-AREA C	HYDRAULIC FLUIDS	15-20 GALS./MO.	BURNED ON-BASE → DPDO

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

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*BASED ON CURRENT RATES AND BEST ESTIMATES OF PAST RATES

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

WASTE GENERATIONS

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY*	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 1960 1970 1980)
4950th TW FIELD MAINT. SQ (CONT.)				
TEST CELL	256-AREA C	WASTE OILS, HYDRAULIC FLUID, SOLVENTS (PD-680), WASTE FUEL	500 GALS./MO.	BURNED ON-BASE → DPDO
CORROSION CONTROL (PAINT SHOP)	105-AREA C	PAINT STRIPPERS PAINT THINNERS LAQUER THINNERS SPOILED OR WASTE PAINT TOLUENE NAPTHALENE METHYL ETHYL KETONE ACETONE	140 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		PAINT STRIPPINGS	275 GALS./YR.	BASE LANDFILL → CONTRACTOR DISPOSAL DPDO
SUPPORT EQUIPMENT BRANCH	109-AREA C	SOLVENT	25 GALS./MO.	BURNED ON-BASE → DPDO
		WASTE OIL	40 GALS./MO.	BURNED ON-BASE → DPDO
	4044-AREA C	WASTE OIL	10,000 GALS./YR.	BURNED ON-BASE → DPDO
		SOLVENTS	UNKNOWN	BURNED ON-BASE → DPDO
	4046-AREA C	WASTE OIL	10,000 GALS./YR.	BURNED ON-BASE → DPDO
4950th ORG MAINT. SQ				
WASH RACK	4024-AREA C	SOAP AND DETERGENT	UNKNOWN	SANITARY SEWER
CORROSION CONTROL (PAINT SHOP)	4024-AREA C	STRIPPERS (ORGANIC), SOLVENTS PAINT THINNERS, SPOIL OR WASTE PAINT	100 GALS./WK.	BURNED ON-BASE → CONTRACTOR DISPOSAL

KEY

———— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

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*BASED ON CURRENT RATES AND BEST ESTIMATES OF PAST RATES

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

WASTE GENERATIONS

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY*	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 1960 1970 1980)
4950th AVIONICS MAINT. SQ				
PRECISION MEASUREMENT EQUIPMENT LAB (PMEL)	884-AREA C (168-AREA C PRIOR TO 1968)	WASTE OILS, CLEANING SOLVENTS	50 GALS./6 MOS.	BURNED ON-BASE; CONTRACTOR DISPOSAL
		MERCURY WASTES	1 GAL./YR.	TO SALVAGE; CONTRACTOR DISPOSAL
		VACUUM TUBES	2 GALS./6 MOS.	CONTAINERIZED FOR CONTRACTOR DISPOSAL; COUNTY LANDFILL
DIRECTOR SUPPORT				
TECHNICAL PHOTOGRAPHIC DIV.	30-AREA B (600-AREA B PRIOR TO 1965)	FIXER SOLUTION	(TOTAL QUANTITY UNKNOWN, 90 GPM WHEN IN USE)	SANITARY SEWER; SILVER RECOVERY TO SANITARY SEWER
AUDIOVISUAL SQ				
PRODUCTION BRANCH	30-AREA B	FIXER SOLUTION	UNKNOWN	SANITARY SEWER; SILVER RECOVERY TO SANITARY SEWER
2750th AIR BASE WING				
WRIGHT MAINTENANCE UNIT	38-AREA B	STODDARD SOLVENT, WASTE OIL	75-100 GALS./MO.	BURNED ON-BASE; DPDO; CONTRACTOR DISPOSAL
MAINTENANCE SHOP UNIT	58-AREA C	STODDARD SOLVENT, WASTE OIL	2,000 GALS./YR.	BURNED ON-BASE; DPDO; CONTRACTOR DISPOSAL
		BATTERY ACID	UNKNOWN	NEUTRALIZED TO SANITARY SEWER; CONTRACTOR DISPOSAL
GENERAL PURPOSE UNIT AND SPECIAL PURPOSE UNIT	60-AREA C	WASTE OIL	200 GALS./MO.	BURNED ON-BASE; DPDO; CONTRACTOR DISPOSAL
		STODDARD SOLVENT	150 GALS./MO.	BURNED ON-BASE; DPDO; CONTRACTOR DISPOSAL

KEY

———— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

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*BASED ON CURRENT RATES AND BEST ESTIMATES OF PAST RATES

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

WASTE GENERATIONS

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY*	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 1960 1970 1980)
2750th AIR BASE WING (CONT.)				
AUTO HOBBY SHOP	1244-AREA C	STODDARD SOLVENT, WASTE OIL, TRANSMISSION FLUID, BRAKE FLUID	200 GALS./MO.	BURNED ON-BASE → DPDO
ENTOMOLOGY UNIT	272-AREA A	EMPTY PESTICIDE CONTAINERS	4 DRUMS/MO./SUMMER	COUNTY LANDFILL → CONTRACTOR DISPOSAL
MILITARY GOLF COURSE	878-AREA A	EMPTY HERBICIDE AND PESTICIDE CONTAINERS	2 DRUMS/MO./SUMMER	COUNTY LANDFILL →
FUEL MAINTENANCE	POL TANK FARM	STORAGE TANK BOTTOMS	700 GALS./YR.	BASE LANDFILL/ BURIAL PIT → COUNTY LANDFILL
		FUEL FILTER ELEMENTS	600 ELEMENTS/3 YRS.	BASE LANDFILL → COUNTY LANDFILL
EXTERIOR ELECTRICS	AREA'S A, B, C	OILS CONTAINING PCB'S	700 GALS./5 YRS.	DPDO → STORED ON-SITE
ORIENTATION GROUP (AFOG)				
PAINT SHOP	6-AREA B (MOVED TO DESC, 1981)	SINTARI (ENAMEL) PAINTS, THINNERS	25 DRUMS/18 MOS.	BASE LANDFILL → CONTRACTOR DISPOSAL
MACHINE SHOP	4-AREA B (MOVED TO DESC, 1981)	CLEANING SOLVENTS	3 DRUMS/YR.	BURNED ON-BASE → DPDO
AIRCRAFT SECTION	4-AREA B (MOVED TO DESC, 1981)	CLEANING SOLVENTS, PAINT STRIPPERS	3 DRUMS/YR.	BURNED ON-BASE → DPDO
GENERATOR MAINTENANCE SHOP	4-AREA B (MOVED TO DESC, 1981)	WASTE OIL	1 DRUM/YR.	BURNED ON-BASE → DPDO

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

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*BASED ON CURRENT RATES AND BEST ESTIMATES OF PAST RATES

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

WASTE GENERATIONS

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY*	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
AIR FORCE MUSEUM				
AIRCRAFT RESTORATION AND PRESERVATION AND EXHIBITS DIV.	4C-AREA B 4D AREA B	SOLVENT WASTES PAINTS WASTES THINNERS	2 DRUMS/YR.	BASE LANDFILL → CONTRACTOR DISPOSAL

KEY

———— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

*BASED ON CURRENT RATES AND BEST ESTIMATES OF PAST RATES

were burned on-site. Acids from battery shops and plating facilities were neutralized in batch tanks at the landfills and discharged to the ground. Other miscellaneous hazardous chemicals were either stored at specific sites or placed in chemical trenches at several landfills throughout the base. The most common materials disposed of from the base shops included waste oils, cleaning solvents, waste fuels, and acids.

Research and Development Laboratories

Wright-Patterson AFB has been the site of extensive aeronautical research since the first World War. Laboratory missions and organizations have changed often through the years, but since 1951, have come under the supervision of the Air Research and Development Command (ARDC), which later became the Air Force Systems Command (AFSC).

The hazardous waste generated by the laboratories in Area B contain an extremely diversified mixture of chemicals, solvents and petroleum products; however, the individual quantities of any one particular substance may be quite small and are highly variable from year to year. A list of research laboratories which handled hazardous materials or generated hazardous wastes is presented in Appendix E. Table 4.2 lists the principal wastes generated in each of the laboratories and reflects the nature of their individual research efforts. In general, the quantities listed in this table are representative of the 1970's, although in most cases, the activities generating these wastes have been going on for 40 or more years.

The largest laboratory activity currently at Wright-Patterson AFB is that of the Air Force Wright Aeronautical Laboratories (AFWAL), which is an umbrella organization encompassing flight dynamics, aero propulsion, avionics and materials labs. These laboratories are involved in both basic and applied research, and interface with university, industrial and government research efforts to develop and evaluate new technologies for the Air Force.

Prior to 1975, the Aerospace Research Laboratory (ARL) was located at Wright-Patterson AFB. It had as its function the performance of basic scientific research in all fields related to Air Force operations. This basic research function was split between AFWAL and outside university research labs when the ARL was dissolved in 1975.

TABLE 4.2

RESEARCH & DEVELOPMENT LABORATORIES

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 1960 1970 1980)
AVIONICS LAB (AFWAL/AA)	620, 23, 622, 821, 435, 22, 22B (AREA B)	ORGANIC SOLVENTS, OILS, GREASES	30 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		FREON T-WD602 (& OTHER COOLANTS)	100 LBS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		MISCELLANEOUS CHEMICALS & REAGENTS (SEE APPENDIX)	25 LBS./MO.	BASE LANDFILL → CONTRACTOR DISPOSAL
	22, 22B	GUN CLEANING: OILS, TCE, SOLVENTS, GREASES, RAGS, PAPER, ETC.	UNKNOWN	BURNED ON-BASE OR BASE LANDFILL
	22, 22B (AREA B)	GUNPOWDER & MUNITIONS	UNKNOWN	DESTROYED BY BASE ORDNANCE
AEROPROPULSION LAB (AFWAL/PO)	92, 92D, 352, 18, 18A, B, C, D, E, 70, 71A, 71B, 21, 20 (AREA B)	PETROLEUM PRODUCTS: OILS, FUELS, LUBRICANTS, SOLVENTS	5,000 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		CARBON REMOVAL COMPOUNDS	40 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		BATTERIES & CELLS: Ni-Cd, Hg O-Zn, Ag O-Zn, ORGANIC (Li-S, Li-CF, Li-V)	100 TOTAL/MO.	CONTRACTOR DISPOSAL
MATERIALS LAB (AFWAL/ML)	450, 651, 652, 653, 32, 56, 51 (AREA B)	PETROLEUM PRODUCTS: FUELS, LUBRICANTS, HYDRAULIC FLUIDS, OILS	UNKNOWN	BURNED ON-BASE → CONTRACTOR DISPOSAL
		SOLVENTS: BENZENE, METHYLENE CHLORIDE, ACETONE, FREON, ALCOHOLS, KETONES, TETRAHYDROFURAN	50 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

TABLE 4.2 (cont'd)

RESEARCH & DEVELOPMENT LABORATORIES

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 1960 1970 1980)
MATERIALS LAB (AFWAL/ML) (CONT.)	450, 651, 652, 653, 32, 56, 51-(AREA B)	SYNTHETIC & EXPERIMENTAL LUBES: SILICATE ESTERS, DI-ESTERS, POLYPHENOL ETHERS	8 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		TETRACHLOROETHYLENE	15 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		CARBON REMOVAL COMPOUNDS	35 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		MISCELLANEOUS ACIDS, MINERALS	15 GALS./MO.	NEUTRALIZED TO SURFACE WATERS → CONTRACTOR DISPOSAL
		MISCELLANEOUS CHEMICALS & REAGENTS	UNKNOWN	BASE LANDFILL → CONTRACTOR DISPOSAL
	51-(AREA B)	PLATING RINSES (CONTINUOUS)	UNKNOWN	NEUTRALIZED TO SANITARY SEWER
		PLATING SOLUTIONS (CN, Zn, Cr, Ni, Cd, Sn, Cn)	50 GALS./DUMP (ONCE OR TWICE/YR.)	NEUTRALIZED TO ON-BASE LANDFILL
FLIGHT DYNAMICS LAB (AFWAL/FI)	45, 65, 31, 93, 13, 27, 145, 24C, 26, 461, 50A, 450,	PETROLEUM PRODUCTS: OILS, FUELS, HYDRAULIC FLUIDS, LUBRICANTS, SOLVENTS	300 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		CARBON REMOVAL COMPOUNDS	65 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		SYNTHETIC LUBRICANTS	40 GALS./MO.	CONTRACTOR DISPOSAL
	GUN RANGE	FUEL/WATER MIXTURE FROM SURVIVABILITY TESTING (JP-4, 5, 8, OTHERS)	4,000 GALS./MO.	RUNOFF TO STORM SEWER, PERCOLATION → EVAPORATION, CONTRACTOR DISPOSAL

KEY

———— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

TABLE 4.2 (cont'd)

RESEARCH & DEVELOPMENT LABORATORIES

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 1960 1970 1980)
AEROSPACE MEDICAL RESEARCH LAB (AFAMRL)	79, 79A, 433, 429	HYDROCARBON SOLVENTS	50 GALS./YR.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		HALOGENATED SOLVENTS	150 GALS./YR.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		PETROLEUM PRODUCTS: OILS, LUBRICANTS, HYDRAULIC FLUIDS, FUELS	UNKNOWN	BURNED ON-BASE → CONTRACTOR DISPOSAL
		ETHYLENE GLYCOL/WATER SOLN.	500 GALS./MO.	CONTRACTOR DISPOSAL
		VARIOUS HYDRAZINE COMPOUNDS	5 LBS./YR.	NEUTRALIZED TO SANITARY SEWER OR DESTROYED BY BASE ORDNANCE
		CHEMICAL OXIDIZERS	UNKNOWN	NEUTRALIZED TO SANITARY SEWER
		CONTAMINATED DIOXIN, ANIMAL FLESH & LAB SUPPLIES	100 μGRAMS/WK.	INCINERATED IN BLDG. 838 → CONTRACTOR DISPOSAL
		BERYLLIUM COMPOUNDS	UNKNOWN	
		IMPACT SENSITIVE MATERIALS: PICRIC ACID	UNKNOWN	DESTROYED BY BASE ORDNANCE
		ANIMAL CARCASSES FROM VETERINARY LAB & TOXIC TESTING	UNKNOWN	BASE LANDFILL → INCINERATED IN BLDG. 838
		CONTAMINATED LAB SUPPLIES, FECES, BEDDING	UNKNOWN	BASE LANDFILL → INCINERATED IN BLDG. 838
AEROSPACE RESEARCH LAB (ARL) (DISBANDED IN 1975)	450	PETROLEUM PRODUCTS: OILS, FUELS, SOLVENTS, HYDRAULIC FLUIDS	100 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL
		CARBON REMOVAL COMPOUNDS	20 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME FRAME DATA BY SHOP PERSONNEL

TABLE 4.2 (cont'd)

RESEARCH & DEVELOPMENT LABORATORIES

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 / 1960 / 1970 / 1980)
AEROSPACE RESEARCH LAB (ARL) (DISBANDED IN 1975) (CONT.)	450	MISCELLANEOUS CHEMICALS & REAGENTS	20 LBS./MO.	BASE LANDFILL → CONTRACTOR DISPOSAL
		HERBICIDE ORANGE CONTAMINATED MATERIALS	UNKNOWN	CONTRACTOR DISPOSAL
AEROSPACE FUELS LABORATORY (AFLC/SFQLA)	70-(AREA B)	PETROLEUM PRODUCTS: OILS, FUELS, GREASES, HYDRAULIC FLUIDS, LUBRICANTS	200 GALS./MO.	BURNED ON-BASE → CONTRACTOR DISPOSAL

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

The Aerospace Medical Research Laboratory (AMRL) has been located at Wright-Patterson AFB since the 1930's and has been under the supervision of the Aerospace Medical Division of AFSC, headquartered at Brooks AFB since 1961. The three principal areas of the AMRL research are Health Effects and Toxicology, Human Engineering, and Biodynamics and Bioengineering. The aim of the AMRL research is to ensure the safety and efficient operation of new Air Force technology.

The Aerospace Field Laboratory (SFQLA) is a quality control lab which tests various petroleum products including oil, hydraulic fluids, lubricants, greases, and fuels for the Logistics Command. At least two other major laboratory functions were at one time located at Wright-Patterson AFB. A research group investigating rocket propulsion systems was moved to Edwards AFB in 1963, when the rocket Propulsion Laboratory was formed. This group made use of a storage area (Bldg 92) in Area B for rocket propellants, primarily chemical oxidants. This site was later utilized by the Fuels and Lubes Division of the Propulsion Lab. It is currently used as an oil storage area, along with Building 352. The ultimate disposition of these oxidants is unknown.

Wright-Patterson AFB was also the site of an armaments laboratory prior to 1957, when this function was moved to the Air Proving Ground Center at Eglin AFB. The armaments lab used the gun range in Area B for testing aircraft weapons systems. Associated with this was an extensive gun cleaning operation in Buildings 22 and 22B, as well as munitions storage in the Woodland Hills area and near Building 22A. The gun range has since been taken over by the Flight Dynamics Lab and is used for survivability tests.

Aircraft parts such as fuel tanks, flight control equipment and engines, are tested at the gun range under simulated battle conditions to study aircraft survivability. This testing often resulted in large quantities of fuel, mostly JP-4, being spilled from ruptured tanks and lines. Until about 1979 this fuel was blown onto the hillside behind the test facility where it burned, evaporated, percolated into the ground, or ran off to the storm water collection system. At that time, a concrete pad and run-off system was installed to catch the fuel, and about 1980 an oil-water separator was added to the system to remove the fuel from the wash water. The fuel which remained within the test

facility was collected in a slop tank along with wash water and was later piped into the oil-water separator system. This fuel was then collected with other waste petroleum products on base for recovery or reuse.

The greatest use of petroleum products in Area B is the Fuels and Lubes Division of the Aero Propulsion Laboratory. In addition to storage areas at Building 92 and 352, the Aero Propulsion Lab had a storage facility at Building 90 until several years ago. There were also several underground tanks used for fuel storage, as well as storage of waste petroleum products. Most waste petroleum products in Area B have been collected in cans, drums or scrap tanks, and pumped at intervals to tank trucks for disposal or recovery.

Laboratories which make extensive use of petroleum products have oil/water separators on the drains from the laboratory. Most of these separators are designed or have been converted to discharge into the sanitary sewer system, although some separators still discharge to the storm sewer as identified in Appendix C, Table C.6. Disposal of waste petroleum products has been through base Civil Engineering and prior to 1973, the materials were burned at Twin Lakes. After that time, independent contractors were invited on base to reclaim or recover these materials.

A wide variety of laboratory chemicals and reagents have been used in Area B. One of the largest generators of waste chemicals has been the Materials Laboratory. Although an extremely diverse mixture of chemicals is included in the hazardous waste generated in Area B, the total amount of any single compound has generally been rather small. Prior to 1973, the various labs disposed of these chemicals in a number of ways. Some were collected for disposal by the base. Some were given or sold to area universities and some were flushed to the sanitary sewer or placed in dumpsters.

After 1973, chemical disposal was generally managed by the base, and these materials were segregated for pickup and disposal by off-base contractors. Some materials which were of an obvious hazardous nature, such as mercury, cyanide and toxic materials tested by AMRL, were handled by special procedures that included recovery, redistillation, or chemical neutralization prior to disposal. Some of the laboratories, in

particular Buildings 51, 56 and 450, have lime neutralization pits through which liquid wastes pass before being discharged to the sanitary sewer. Gas cylinders or bottles are generally returned to the suppliers for disposal, although interviews have determined that a number of these cylinders, including some containing pyrophoric gases, were disposed of in base landfills prior to 1973.

Waste materials from the AMRL Toxic Hazardous Facility in Building 79 are of particular concern since some of these materials are extremely toxic. Toxicology research began in 1956, although toxic substances per se were not handled until the mid-1960's, when rocket propellants and Titan Missile propellant testing began. These substances include small quantities of hydrazine, which were chemically neutralized before disposal. Oxidizers such as oxofluorene, chlorofluorene, oxygen difluoride and pentachlorofluorene were chemically neutralized to nontoxic calcium salts and other products. These materials were then flushed into the sanitary sewer system.

Some fuels, rocket propellants and explosives, such as picric acid, were destroyed by base ordnance personnel. Beryllium oxides, also tested at AMRL, were held until recently, in 1980, when they were disposed of through an off-base contractor. Most excess chemicals had been retained in Building 79 until the last few years, when off-base contractors have been used extensively to dispose of them.

Gases from the Thomas Dome Environmental Chambers pass through scrubbing neutralization systems prior to discharge and the wash water from these systems goes to the sanitary sewer. Incinerators in Building 838 have been used since 1965 for burning animal carcasses and contaminated laboratory supplies. Prior to 1965, when Building 838 was built, animal carcasses were known to have been disposed of in base landfills with no precautions or special handling. Radioactive tracers and chemicals used in AMRL testing have been disposed of through the Radiation Protection Officer in accordance with governing regulations and techical orders.

Pesticide and Herbicide Utilization

The WPAFB pesticide/herbicide program was combined under the Sanitation Section's Entomology Shop in approximately 1970-1971. Prior to that time, pest control was administered by the Entomology Shop and weed

control was administered by the Pavement and Grounds Section. The present shop is located in Building 272, Area A. The shop's function is to control vegetation, rodents and insects on the base, treating some areas routinely while others are sprayed as needed. Both truck mounted and hand held sprayers are utilized. A variety of pest and herbicide control chemicals are used throughout the year.

Unused chemicals are typically drained from spray equipment into labeled drums for reuse. Wash and rinse water are also retained for future use as make-up water.

In accordance with EPA guidelines, pesticide containers are triple rinsed and punched with holes to prevent reuse. These containers have been removed by waste contractors since 1975. Prior to 1975, the containers were disposed in the county landfills.

On occasion small quantities of off-spec or unused chemicals were disposed by a contractor. Before 1974, if a particular pesticide waste required disposal; the shop would notify the refuse bulldozer operator to dig a special hole in the landfill area. The chemical container was placed in the hole and covered immediately. This procedure was known to have occurred at Landfill No. 5 near Twin Lakes when chlordane was placed there.

The two golf courses on base maintain their own pest control programs. All diluted chemicals on-hand are utilized daily. Chemical containers are triple rinsed prior to disposal at the county landfill.

Radioactive Wastes

Wright-Patterson has been the site of research to evaluate the effects of ionizing radiation on the function of aircraft systems. In addition, radioactive materials have been used as tracers in medical and toxicological research, as calibration sources for various instruments, in the evaluation and development of new materials, and for educational purposes in the physics department of AFIT. There are a number of sources of ionizing radiation on base which are sealed and do not generate waste materials. These include flight instruments, calibration devices, and a cobalt-60 radiation therapy source in the base hospital. All sources of ionizing radiation are managed in accordance with Air Force and NRC regulations.

The major sources of radioactive waste materials generated on base include:

- nuclear reactor (now decommissioned), Bldg. 470
- AFIT Physics Department, Bldg 470 and 640
- AFWAL Materials Lab, Bldg 433
- AFAMRL Health Effects Laboratory, Bldgs 79, 838, 29
- AF Medical Center, Nuclear Medicine Dept. Bldg 830

The management of these materials is through the Radiation Protection Officer of the SGPB. The Radiation Protection Officer is responsible for the proper handling and disposal of all radioactive materials. These are handled in accordance with 10 CFR, and in Air Force regulations. The wastes generated are generally low-level with short half lives. These are temporarily stored in a secure area near Bass Lake (Bldg 4054) in Area C. The materials are periodically tested, and if sufficient decay has occurred, they are disposed of in the sanitary sewer system in accordance with 10 CFR Part 20. Otherwise, they are disposed of by an off-base contractor. Another radioactive waste holding area exists behind Bldg 470. There are several 5000 gallon underground tanks which have received small quantities (1 gal/mo) of liquid wastes from the AFIT nuclear chemistry lab. These materials are disposed of in the same manner. A third radioactive waste holding area, now no longer in use, was located south of Loop Road near Gate 22B. Low-level wastes are also thought to have been disposed of in base landfills in the past, although the total amounts are probably in the millicurie range.

A large cobalt 60 source, originally in Bldg 433 (Materials Lab), was disposed of off base in the late 1960's. Part of this source was transferred to the Florida State Health Department, while the remainder was accepted by the Nuclear Engineering Corporation of Morehead, Kentucky.

The nuclear reactor (Bldg 470) on base was operated from early 1965 until its decommissioning in 1970. The decommissioning was supervised by the NRC. The source material was removed and the reactor core was filled with sand and sealed with concrete. During its operation, low level liquid wastes, principally cooling water, were disposed of in the sanitary sewer in accordance with 10 CFR Part 20. Occasional sampling

of the Dayton wastewater and treatment plant sludges indicated no problems with this disposal technique.

A radioactive waste disposal site exists in Area B near Bldg 657. The site consists of a pit of unknown construction covered by a concrete slab. The pit is enclosed by a cyclone fence and occupies an area of about eight feet square. The site was closed prior to 1951, and its contents are unknown; however, monitoring by the EPA indicated no apparent leakage or increase in background radiation.

Fuel Management

The WPAFB fuels management storage system consists of a number of underground and above ground storage tanks in various locations throughout the base. The fuels handled are JP-4, JP-5, diesel, leaded MOGAS, unleaded MOGAS, AVGAS, kerosene and fuel oil. Additional storage tanks are utilized for solvent and deicing fluid. The largest POL storage area on base is located in Area C adjacent to Building 154. This area is used for storing, issuing and receiving fuels. Dikes within the POL storage area are covered with asphalt. Runoff from the dikes drain into a small holding tank for containment of oil spills.

A hydrant system is utilized on base in an area known as the West Ramp. The system was originally established to provide fuel for SAC operations and is presently supporting the 4950th Test Wing. A fuel distribution subunit located in Area B was discontinued in 1972. Another hydrant system located in Zone 7, north of Hanger 152, was shut down in 1970-71. The underground tankage, still in place, was treated with caustic. Table C.3 summarizes the fuel tankage in use at the base.

Waste and Recoverable Petroleum Products

Used or contaminated petroleum products are stored in tanks and periodically picked up by Civil Engineering and placed in an underground tank behind Building 13, Area C. This tank is pumped periodically by a waste oil reclaimer. The following is a breakdown of the number of intermediate tanks used for waste petroleum storage:

Item	Above Ground	Below Ground
Waste Oil	-	22
Waste JP-4	1	4
Waste JP-5	-	1
Waste Fuel	-	2

Underground tanks are leak tested every six months.

Petroleum and Chemical Spills

A number of fuel spills occur annually on the flightline or in maintenance areas. For the most part these are relatively small spills; for instance, during the period of January through October 1981, approximately 97 fuel spills occurred. Most of these spills were less than 20 gallons. Fuel records are maintained for a two year period.

A number of Wright-Patterson AFB personnel were questioned concerning larger spills. In addition, written reports existing on some of the significant spill incidents were reviewed. Information on three significant spill incidents identified are summarized in Table 4.3 and shown in Figures 4.2 and 4.3.

Fire Training

The Fire Department has operated five fire training areas since 1957. These areas have continued to serve as a practice/learning/extinguishing area, where petroleum based fires are set and extinguished. The following are specific designations for the individual training areas as well as their approximate period of operation. (See Figure 4.3 and Figure 4.4) (See Appendix F Photographs pg. F-5):

Fire Training Area	Period of Operation
No. 1	1950-1955
No. 2	1955-1960
No. 3	1960-1980
No. 4	1960-1980
No. 5	1981

In the past, the common mode of operation was for the Fire Department to burn contaminated fuels. This practice was followed in training areas No. 1, 2 and 3. As air pollution control regulations became more stringent in the mid 60's, the fire training exercises were curtailed until at the present time there are two fire training exercises per quarter and the fuel utilized is uncontaminated JP-4 fuel. Fire Training Areas No. 1, 2, 3 and 4 are all dirt pits with a surrounding earthen dike to contain the liquid. The ground was initially saturated with water and then the fuel was poured inside the dike from barrels.

TABLE 4.3

SPILL INCIDENTS

Wright Patterson Air Force Base

Spill No.	Date	Location	Spill	Quantity Spilled (gallons)	Comments
1	1972	Fire Training Area No. 3 and 4	Contaminated Fuel	1,000 - 2,000	Fuel was intercepted before reaching the Mad River. Amount recovered not documented.
2	April, 1976	POL Tank Farm - Tank 256	JP-4	8,319*	Approximately 4,000 gal were recovered using ground water wells.
3	March, 1981	POL Tank Farm - between Tank 252 and Fill stand	No. 2 Fuel Oil	1,200 - 2,500	Recovery trench dug - no oil recovered.

*SOURCE: Quantity reported in Pollution Incident Report

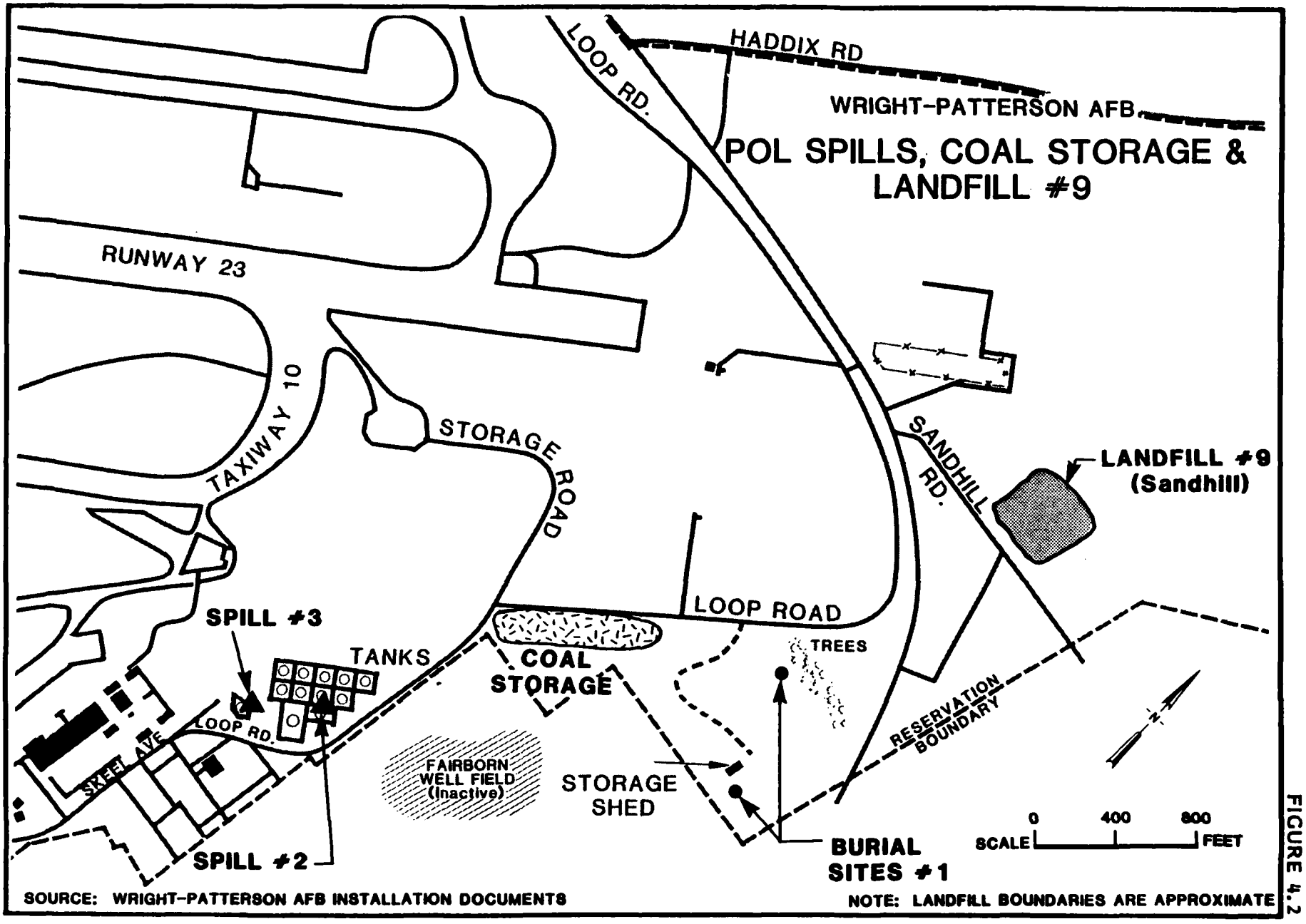

HADDIX RD
LOOP RD.
WRIGHT-PATTERSON AFB
POL SPILLS, COAL STORAGE & LANDFILL #9
RUNWAY 23
TAXIWAY 10
STORAGE ROAD
SANDHILL RD.
LANDFILL #9 (Sandhill)
LOOP ROAD
SPILL #3
TANKS
COAL STORAGE
TREES
SKEET AVE
LOOP RD.
FAIRBORN WELL FIELD (Inactive)
STORAGE SHED
RESERVATION BOUNDARY
SPILL #2
BURIAL SITES #1
0 400 800
SCALE FEET
SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS
NOTE: LANDFILL BOUNDARIES ARE APPROXIMATE

FIGURE 4.2

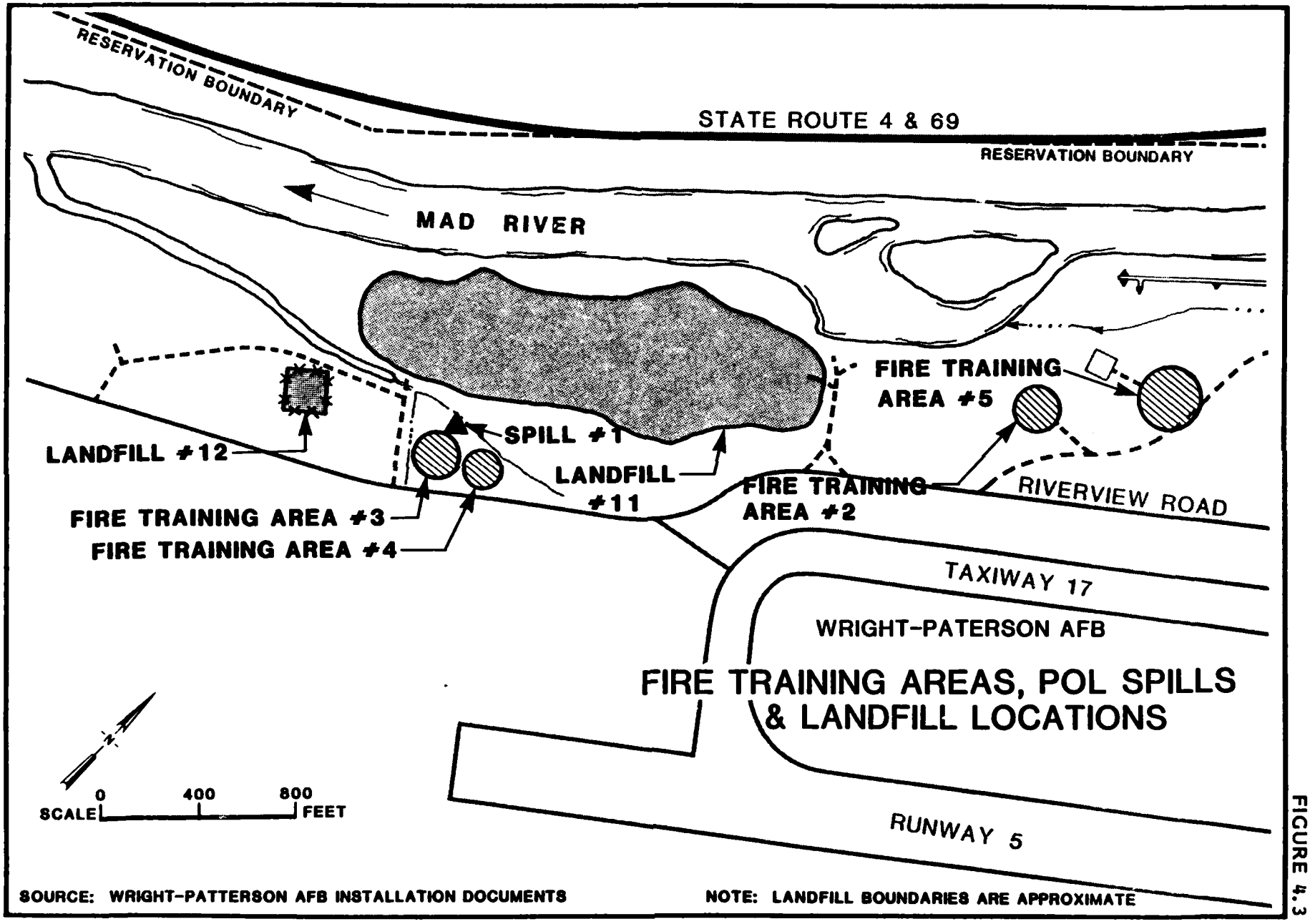

RESERVATION BOUNDARY
STATE ROUTE 4 & 69
RESERVATION BOUNDARY
MAD RIVER
FIRE TRAINING AREA #5
SPILL #1
LANDFILL #12
LANDFILL #11
FIRE TRAINING AREA #2
RIVERVIEW ROAD
FIRE TRAINING AREA #3
FIRE TRAINING AREA #4
TAXIWAY 17
WRIGHT-PATERSON AFB
FIRE TRAINING AREAS, POL SPILLS & LANDFILL LOCATIONS
0
400
800
SCALE
FEET
RUNWAY 5
SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS
NOTE: LANDFILL BOUNDARIES ARE APPROXIMATE

FIGURE 4.3

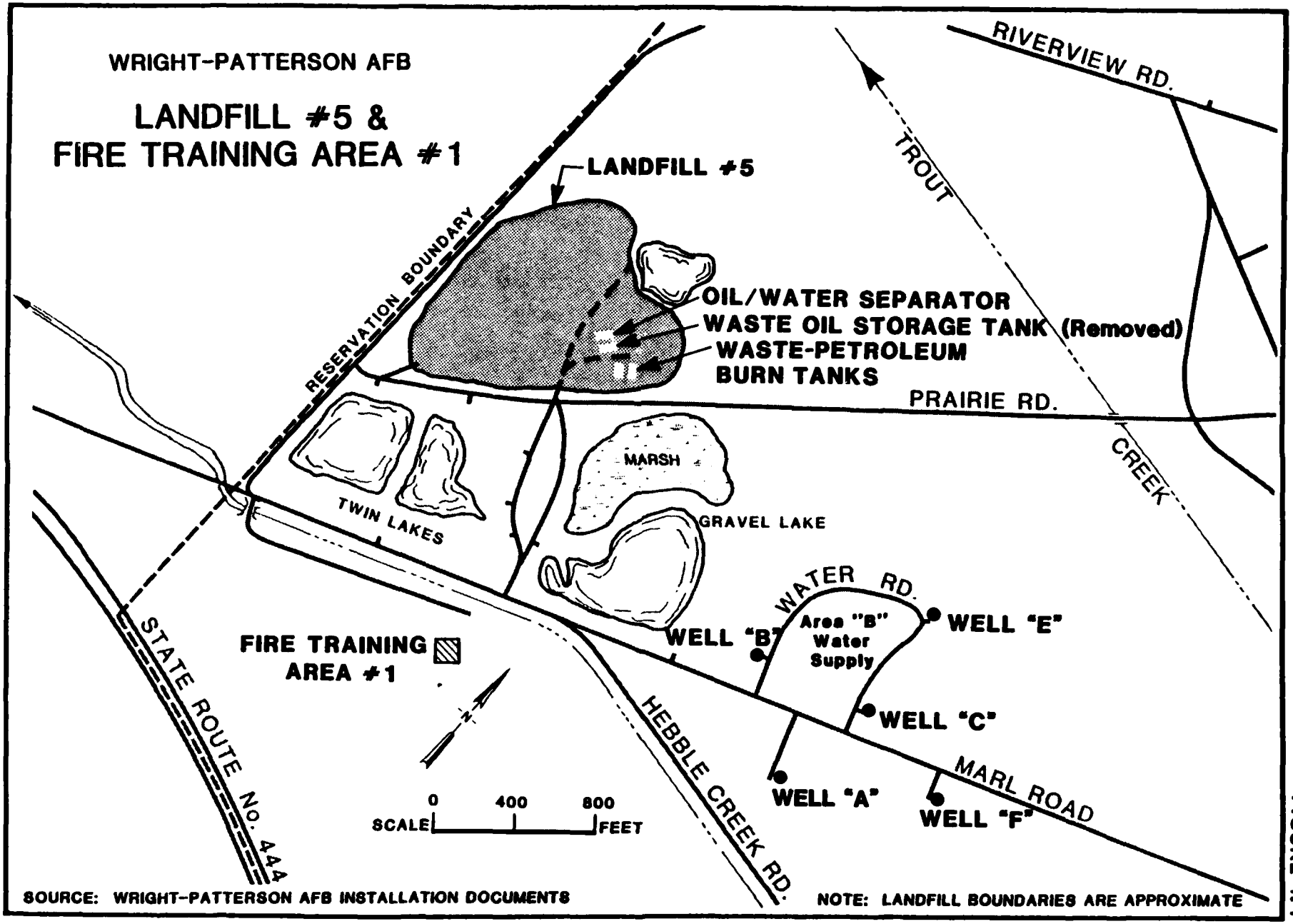

WRIGHT-PATTERSON AFB
LANDFILL #5 &
FIRE TRAINING AREA #1
LANDFILL #5
RESERVATION BOUNDARY
OIL/WATER SEPARATOR
WASTE OIL STORAGE TANK (Removed)
WASTE-PETROLEUM
BURN TANKS
RIVERVIEW RD.
TROUT
CREEK
PRAIRIE RD.
MARSH
TWIN LAKES
GRAVEL LAKE
WATER RD.
Area "B"
Water
Supply
WELL "B"
WELL "E"
WELL "C"
WELL "A"
WELL "F"
MARL ROAD
FIRE TRAINING
AREA #1
STATE ROUTE No. 444
HEBBLE CREEK RD.
N
0
400
800
SCALE
FEET
SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS
NOTE: LANDFILL BOUNDARIES ARE APPROXIMATE

FIGURE 4.4

This procedure was modified slightly during the operation of Fire Training Areas No. 3 and No. 4 when a contaminated fuel storage tank was constructed immediately north of the fire training areas. The fuel was then applied to the training areas directly from this tank. In addition to the storage tank, trucks containing JP-4 were brought to the site and fuel was sprayed onto the training area directly from the trucks.

The current Fire Training Area, No. 5, was placed into service in 1981. The area has a concrete lining which contains all of the petroleum products utilized for the fire training exercise. The concrete pit is filled with water, and fuel is added to the water surface and ignited. A fire retardant is then applied to extinguish the fire. The use of AFFF was initiated within the Air Force in 1972; prior to that time protein foam was utilized as an extinguishing agent.

Based on the past operation of the fire training areas, it is judged that Fire Training Areas No. 3 and No. 4 would have the greatest potential for contamination of either ground or surface water based primarily on its long period of use.

Hazardous Waste Storage

The Defense Property Disposal Office (DPDO) is located in building 744 in Area B at Wright-Patterson AFB and furnishes disposal for excess surplus property generated by the Department of Defense (DOD activities within the base). One responsibility for DPDO is to provide interim storage for hazardous waste before shipment off base. At the present time, because the existing DPDO facility does not meet RCRA standards, Civil Engineering has accumulated drums of hazardous wastes at Bldg. 478 in Area B awaiting disposal by DPDO.

Central Heating Plants

Wright-patterson AFB had five coal fired central heating plants which supplied steam to all of the base. In 1980, the base expanded two plants and closed the three remaining plants. All of the heating plants had outside active coal piles. The runoff from coal piles may be characterized by low pH, high concentrations of chromium, copper, iron, magnesium, nickel or zinc (See Table C.4 for typical coal pile runoff).

The base also maintains a long term coal storage pile in the vicinity of the POL storage area (See Figure 4.2). Runoff from this pile

also poses a potential for contamination of both surface and ground water.

DESCRIPTION OF DISPOSAL METHODS

Waste Management Facilities

The on-site facilities which have been used for management of wastes can be categorized as follows:

- landfills
- storm sewer system
- burial sites
- waste petroleum burn tanks
- septic tanks

The types of waste management facilities are discussed individually in the following subsections. Figures 4.5 and 4.6 show the hazardous waste disposal locations at Areas A, B and C.

Landfills

On-site landfills have been used for disposal of solid and liquid hazardous and nonhazardous wastes at Wright-Patterson AFB. Landfilling has been done at a total of twelve separate locations on base (See Figures 4.5 and 4.6). Table 4.4 contains a summary of pertinent information concerning each landfill. Since 1973, all municipal solid waste generated on-base has been hauled off-base by a private contractor to the county landfill.

Landfill No. 1 operated from the 1920's through 1940 and is situated in the northern portion of Area B just northwest of the Air Force Museum. The site has been estimated to encompass approximately 6.5 acres and is shown in Figure 4.7.

Landfill No. 2 (Tillman Pit) was operated from 1941 to 1955 as a general refuse disposal area for Area B. From 1955 to 1975, the area was utilized as a hardfill disposal area. Tillman Pit was initially a gravel pit encompassing an area of approximately 9 acres. The boundary of the site is shown in Figure 4.6 (See Appendix F - Photographs, pg. F-1).

Landfill No. 3 is located in the northern portion of Area A and served areas A and B from 1940 to 1944. The area encompasses

WRIGHT-PATTERSON AFB

HAZARDOUS WASTE LOCATIONS
Area B

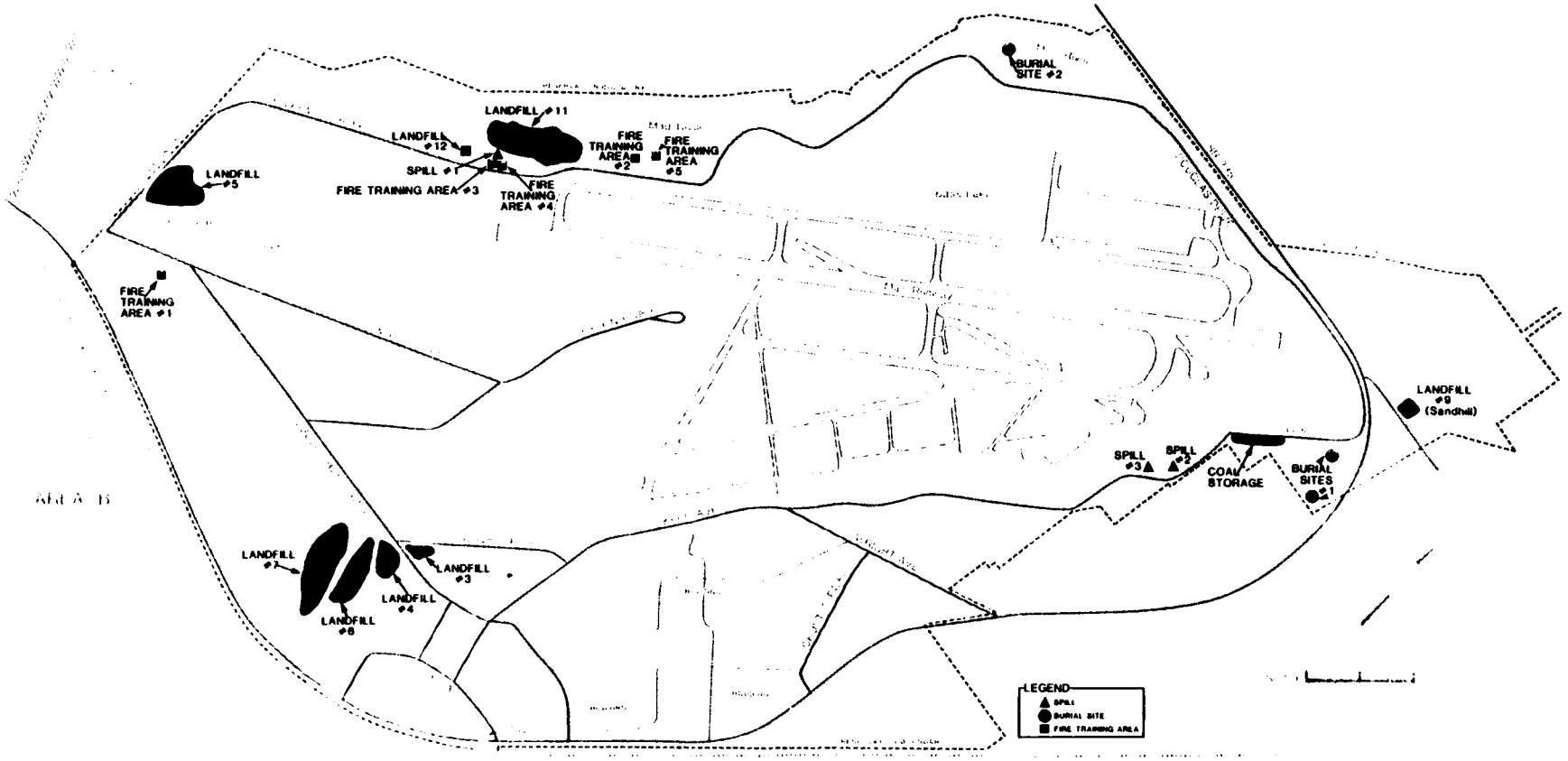
NOTE: LANDFILL BOUNDARIES ARE APPROXIMATE.

SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

FIGURE 4.5

WRIGHT-PATTERSON AFB

HAZARDOUS WASTE LOCATIONS
Areas A & C



SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

NOTE: LANDFILL BOUNDARIES ARE APPROXIMATE.

FIGURE 4.6

TABLE 4.4

LANDFILL INFORMATION SUMMARY

Landfill	Operation Period	Approximate Size (Acres)	Types of Wastes	Method of Operation	Closure Status	Surface Drainage	Comments
No. 1	1920's-1940	6.5	General Refuse	Surface Dump	Inactive - Local soil cover, grass vegetation	Mad River	• Permeable soils • Constructed in gravel pit
No. 2 (Tillman Pit)	1941-1955 1955-1975	9.0	General Refuse Hardfill	Surface Dump	Inactive-Local soil cover, partial vegetation	Unnamed Ditch	• Constructed in gravel pit
No. 3	1940-1944	3.0	General Refuse	Surface Dump	Inactive-Local soil cover, golf course	Hebble Creek	• Constructed in gravel pit
No. 4	1945-1949	5.5	General Refuse	Surface Dump	Inactive-Local soil cover, gravel parking lot	Hebble Creek	• Constructed in gravel pit
No. 5 (Twin Lakes)	1945-present	23.0	General Refuse Hardfill	Surface Dump	Active	Hebble Creek	• Tree cuttings and hardfill being placed in landfill
No. 6	1949-1952	8.5	General Refuse	Surface Dump	Inactive-Local soil cover, pasture land	Hebble Creek	• Intermittent stream crossing landfill • Sanitary sewer adjacent to landfill
No. 7	1952-1962	18.0	General Refuse	Surface Dump	Inactive-Local soil cover, pasture land	Hebble Creek	• Differential settlement
No. 8	1955-1962	13.0	General Refuse	Trench & Cover	Inactive-Local soil cover, native grasses	Hebble Creek	• Leachate observed • Excessive differential settlement
No. 9	1962-1964	9.0	General Refuse	Trench & Cover	Inactive-Local soil cover,	Mud Run	• Constructed in sand pit
No. 10 (Woodland Hills)	1965-1968	10.0	General Refuse	Trench & Cover	Inactive-Local soil cover, partial grass cover	Hebble Creek	• Leachate observed • Sanitary sewer adjacent to landfill • Excessive differential settlement
No. 11	1968-1977	16	General Refuse	Trench & Cover, and Ramp Dump and Compaction	Inactive-Local soil cover, partial vegetation	Mad River	• Differential settlement • Constructed in flood plain
No. 12	1968-1973	--	Hazardous Wastes	Trench & Cover	Inactive-Local soil cover, partial native vegetation	Mad River	• Constructed in flood plain • Deep rooted vegetation growing inside fence

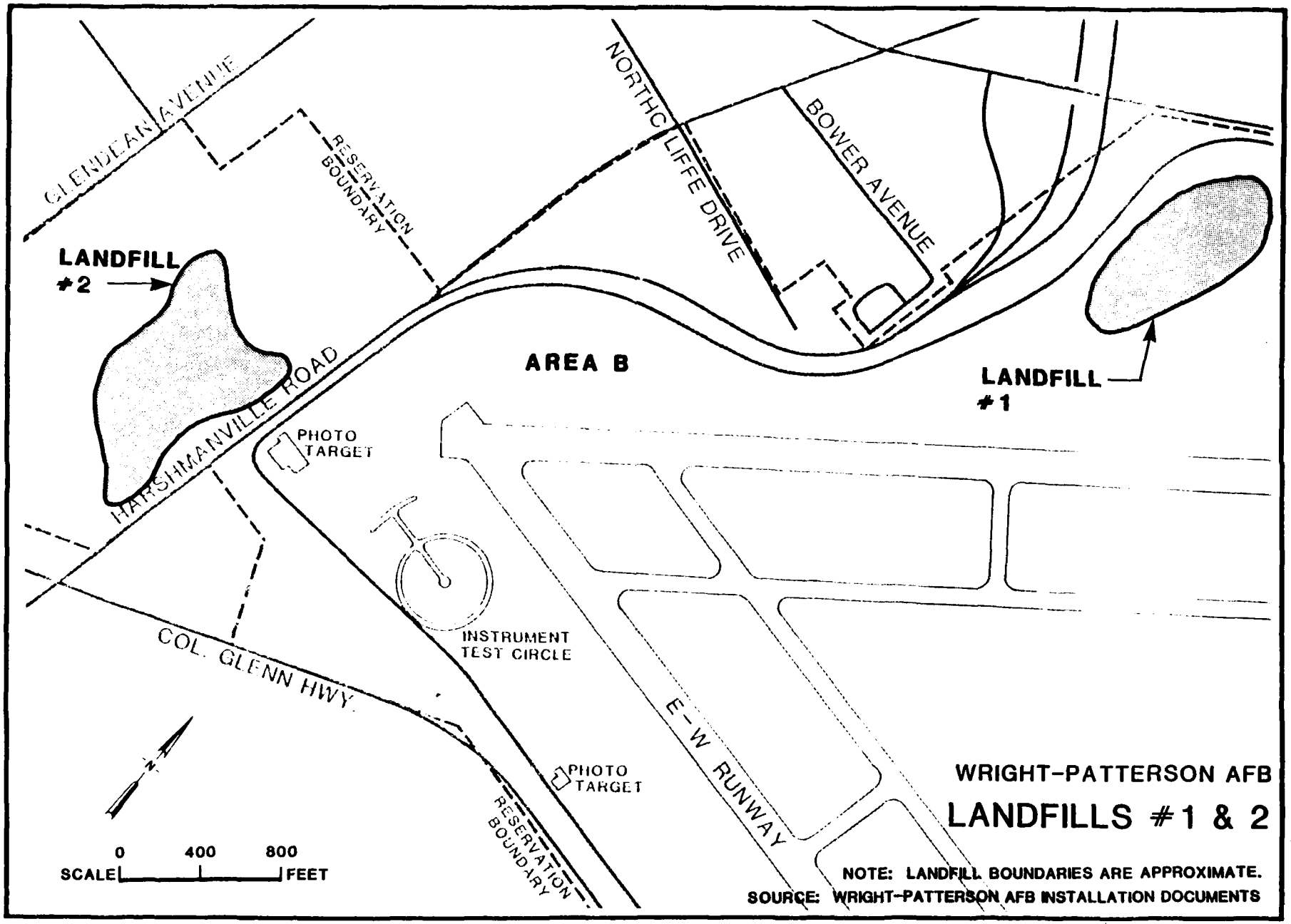

GLENDEAN AVENUE
RESERVATION BOUNDARY
NORTHCLIFFE DRIVE
BOWER AVENUE
LANDFILL #2
LANDFILL #1
AREA B
HARSHMANVILLE ROAD
PHOTO TARGET
INSTRUMENT TEST CIRCLE
COL. GLENN HWY.
E-W RUNWAY
PHOTO TARGET
RESERVATION BOUNDARY
N
0 400 800
SCALE FEET
WRIGHT-PATTERSON AFB
LANDFILLS #1 & 2
NOTE: LANDFILL BOUNDARIES ARE APPROXIMATE.
SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

FIGURE 4.7

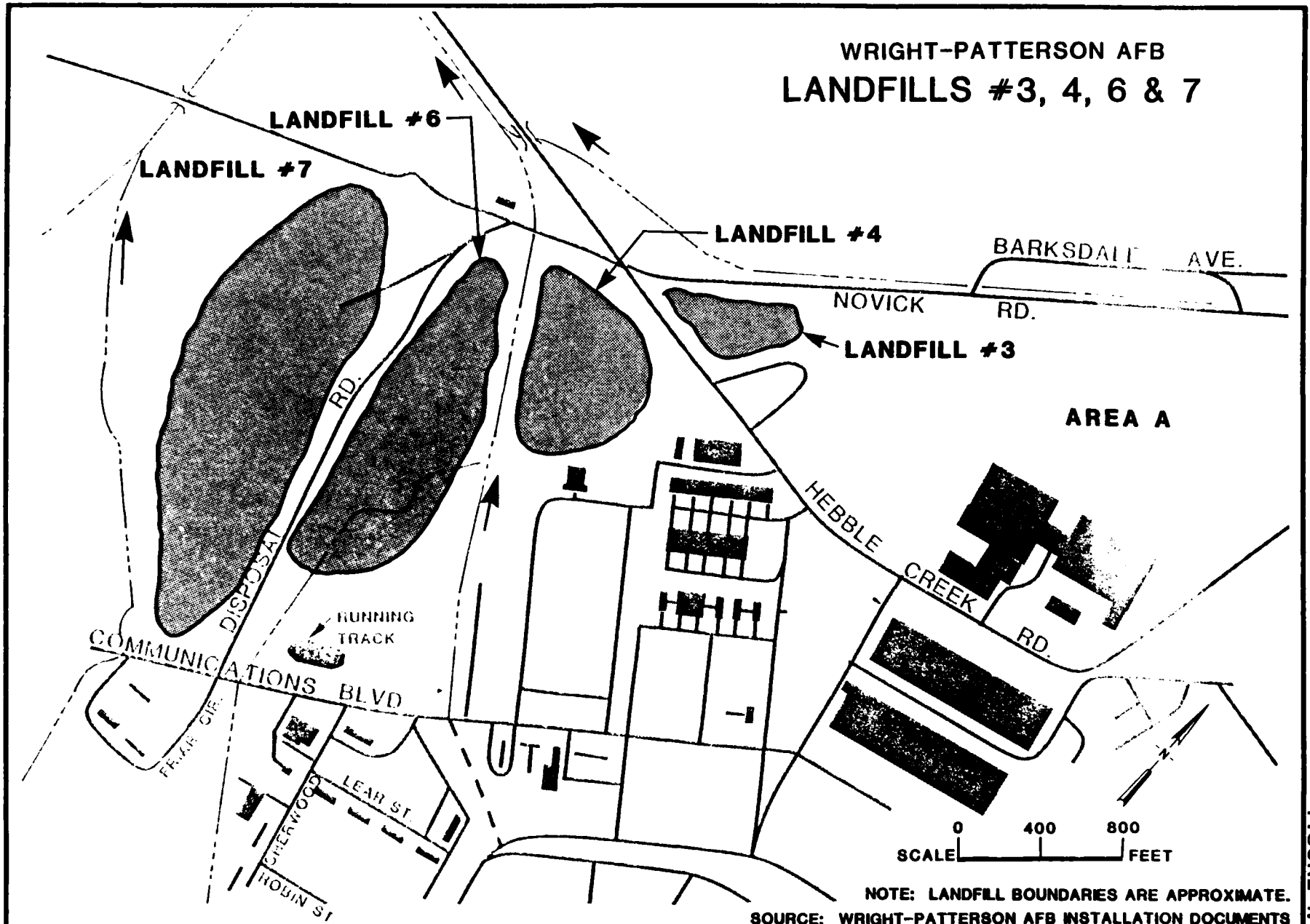

WRIGHT-PATTERSON AFB
LANDFILLS #3, 4, 6 & 7
LANDFILL #6
LANDFILL #7
LANDFILL #4
LANDFILL #3
BARKSDALE AVE.
NOVICK RD.
AREA A
DISPOSAL RD.
HEBBLE CREEK RD.
RUNNING TRACK
COMMUNICATIONS BLVD
FRAZIER
CHEAWOOD
LEAR ST.
HOUIN ST.
0 400 800
SCALE FEET
NOTE: LANDFILL BOUNDARIES ARE APPROXIMATE.
SOURCE: WRIGHT-PATTERSON AFB INSTALLATION DOCUMENTS

FIGURE 4.8

approximately 3 acres and is shown in Figure 4.8. Landfill No. 3 was operated as a surface dump and burn operation.

Landfill No. 4 which was operated between 1944 and 1949 is located within Area A and shown on Figure 4.8. The area encompasses approximately 5.5 acres and was an abandoned gravel pit. During its initial operation, the gravel pit extended approximately 20 to 30 feet below the water surface within the pit. Large objects such as automobile car bodies were placed in the pit in order to fill in the volume beneath the water surface. Once above the water surface, the area was then operated as a trench cover operation with the trench orientation in a northwest to southeast direction. (See Appendix F - Photographs, pg. F-1).

Landfill No. 5 which encompasses 23 acres is shown on Figure 4.2. This area was operated initially during the 40's as a lumber reclamation area where scrap lumber was accumulated and sold to the public. As time progressed, the area was operated as a landfill until the present time. It is the only landfill currently in operation and is accepting fly ash from the base's heating plants.

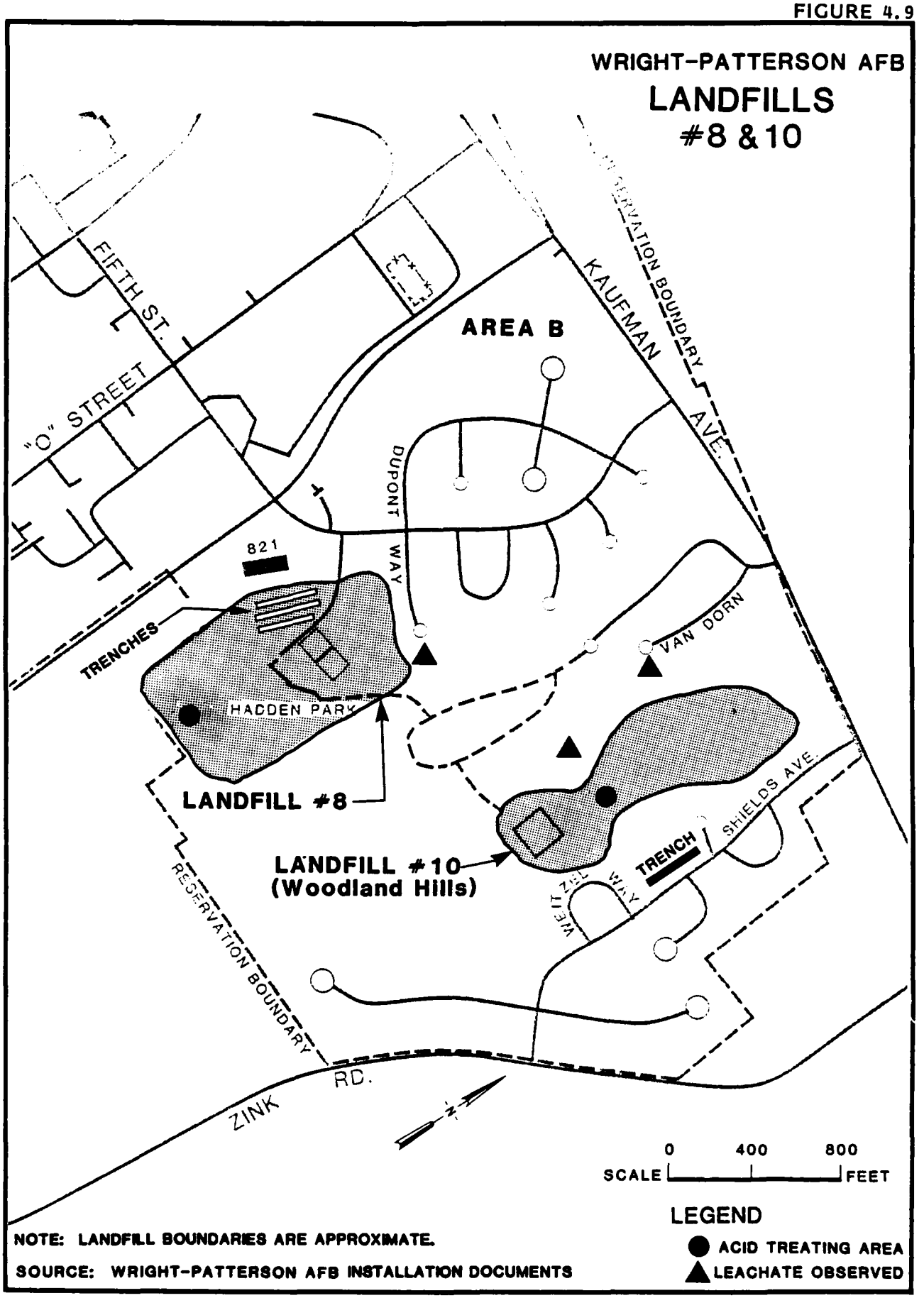
Landfills No. 6 and 7 were operated from 1949 to 1952. The areas encompassed a total of 26.5 acres and are shown in Figure 4.8. Both landfills served Areas A and B and were operated as trench and cover operations. (See Appendix F - Photographs, pg. F-1).

Landfill No. 8 which was operated from 1955 to 1962 received wastes from Area B. The landfill site itself encompasses 13 acres and is shown in Figure 4.9. The depth of the landfill is approximately 50 to 60 feet. Based on interview information, there were three distinct operations which were located at this site and many of the subsequent sites at Wright-Patterson AFB. They were:

- general refuse disposal
- toxic and hazardous chemical disposal
- acid neutralization

General refuse was disposed of in a trench and cover operation with trench orientation north to south. The toxic and hazardous chemical disposal was done in trenches which were segregated from the general refuse disposal area. These trenches are shown in Figure 4.9 and were adjacent to Building 821. All non-acid chemical wastes generated within Area B were disposed of within these trenches. The typical operating

FIGURE 4.9



ES ENGINEERING-SCIENCE

procedure was to throw the individual glass bottles containing chemicals into the trenches to try to break them.

In addition to the toxic and hazardous chemical disposal area, there was an acid neutralization area which was operated on the southern portion of the site. This area included a number of small tanks in which acid was poured from small containers and bottles, and lime was added in order to neutralize the liquid. pH was checked using litmus paper and when neutralized, the liquid would be discharged to the ground and allowed to runoff to the nearest stream.

Landfill No. 9 (Sandhill) was operated for a two year period in the early 60's. This was the first site to receive wastes from Areas A, B and C combined. It represented the consolidation of the Sanitation Section of the Civil Engineering Squadrons from both fields. Sandhill was operated as a trench and cover operation with trenches running in a north-south orientation. The depth of the trenches was approximately 20 feet. The landfill operation was abandoned because of the following reasons: proximity to the glide path of the major runway at Area C, concerns about bird hazards and complaints of neighbors about blowing debris and its remote location from the centroids of generation within the base complex. Landfill No. 9 encompassed an area of 9 acres and is shown on Figure 4.2. (See Appendix F, pg. F-4).

Landfill No. 10 (Woodland Hills) was operated from 1965 to 1968 and received waste from all areas within the base. This landfill like Landfill No. 8 had three distinct waste disposal operations located there. The general refuse disposal was done utilizing a trench and cover operation with the trenches in the northern portion of the site running north to south and the trenches on the southern portion of the site running in an east to west orientation. The landfill itself encompassed 10 acres and is shown on Figure 4.9.

The toxic and hazardous chemical disposal area was in a single trench which is shown in Figure 4.9. (See Appendix F, pg. F-3). Because of the short operating period of this landfill, there was only one chemical disposal trench utilized. During the subsequent construction of the residential homes in the Woodland Hills area, this trench was uncovered by the contractor and personnel from Civil Engineering removed

the chemicals, which were unearthed. These chemicals were then transported to Landfill No. 12 in the early 70's for ultimate burial. The location of the chemical trench is in the vicinity of three residential units (Buildings No. 7011, 7012 and 7018).

In addition to the general refuse and chemical disposal areas, an acid neutralization facility was also located at Landfill No. 10. Its location is shown in Figure 4.9. Small quantities of acid in 5 gallon containers were dumped into a vat and neutralized with lime and then subsequently discharged to the ground surface to run in a westerly direction to follow natural drainage off-base.

Complaints have been received in the past from a number of military housing units which have been built on the eastern and western borders of the landfill. Initial complaints received from the occupants on the eastern portion were corrected in the late 70's by extensive regrading of the landfill. On the western portion of the landfill site, leachate had been observed coming from the hillside behind the homes (See Photo page F-4 in Appendix F). This situation was addressed by installing perforated plastic drainage pipes into the hill immediately behind these residential units thereby directing the leachate into existing catch basins which are sited on a storm sewer which runs behind the homes. This sewer ultimately discharges to Hebble Creek.

In addition to the above, one of the residential units on Weitzel Way has had to be demolished because of extensive differential settlement. A tennis court, which was constructed just west of this residential unit, has also experienced excessive differential settlement. While walking around Landfill No. 10, it was noted that a portion of the site itself is experiencing differential settlement and that ponding of storm water is occurring which will increase the likelihood of leachate generation.

Landfill No. 11 is located on the northern portion of the base within Area C. The site was utilized for general refuse disposal from 1968 to 1977. The landfill location coincides with the previous channel of the Mad River. Over time, the river has moved in a northwesterly direction from this channel. There are sections within the landfill which are as much as fifty feet deep. The landfill has been built up approximately 40 feet into the air (See Photo page F-5 in Appendix F).

The site was initially operated as a trench and cover operation and then was later operated as a ramp dump and compaction procedure with daily cover. During this operation, the landfill was operated two shifts per day from 6 am to 12 midnight. Base personnel remember on occasion observing various chemical wastes being disposed of in the landfill and during the compaction procedure starting fires which had to be put out by the bulldozer operator.

Concurrent with the general refuse disposal in Landfill No. 11 was the operation of the hazardous chemical and acid disposal area at Landfill No. 12 (See Figure 4.3). Landfill No. 12 (acid storage area) encompasses approximately 3000 square feet and is completely enclosed with a cyclone fence. (See Appendix F - page F-5). Initially, this area was utilized to dispose of chemicals which were placed in trenches which were approximately 24 inches wide and three feet deep. In addition to chemical disposal, acids were neutralized in this area utilizing the same procedures as described for Landfills No. 8 and No. 10. Neutralized wastes were allowed to percolate into the soil.

During the latter phases of its operation in the late 70's, the area was utilized to store waste chemicals. In 1973, a contract was let to remove all of the waste chemicals which were stored in this area. During its latter operating period, Landfill No. 12 was utilized to store materials which had been contaminated with herbicide orange. These materials were stored in packages on pallets and were not opened within the storage area. They were later removed by laboratory personnel and disposed of off-site.

Storm Sewer Systems

All surface waters from Wright-Patterson AFB drain in a northwesterly direction to the Mad River. Surface drainage patterns have been presented earlier in Figure 3.1. Storm sewers are utilized at Wright-Patterson AFB only in heavily developed areas, residential areas and areas adjacent to the flightline where the use of drainage ditches is not practical. It is estimated that over 80 percent of the base area is drained by surface ditches.

Over the years, there has been a concerted effort on the part of base personnel to eliminate the discharge of contaminated waste waters to the existing drainage system. As discharges were located, specific

construction projects were completed to remove these discharges from the drainage ditches. From a historical viewpoint, these ditches have received various quantities of fuel oil and other miscellaneous chemical spills and discharges. However, under the current surface water sampling program, analytical data is collected on a monthly basis. The data indicate that residual chemicals in the ditches are not a problem.

Burial Sites

As bulk fuel storage tanks are used for a period of time, a residue of settled material builds up in the bottom. Systematic cleaning of the storage tanks generates approximately 700 gallons per year of sludge. In the past, the sludge was buried in existing landfills as well as burial sites established strictly for disposal. Since 1975, the sludge has been placed in a covered, concrete lined pit for drying. The residue is later disposed with base refuse via dumpsters.

The sludge from leaded gasoline storage tanks contain tetraethyl lead and as such is a hazardous waste under RCRA's definition. Burial sites receiving sludge in the vicinity of the salt storage shed are shown on Figure 4.2 and another site is located adjacent to Mustang Drive (See Figure 4.6).

Waste Petroleum Burn Tanks

In the past, flammable petroleum waste products were collected by Civil Engineering and dumped into two burn tanks which were located near Twin Lakes at Landfill No. 5 (See Figure 4.4) the tanks were two halves of a 10,000 gallon tank, which was cut in half along its horizontal axis. The burning was conducted at night as late as the early 1970's. These tanks no longer remain at the site and should not have contributed to surface or ground water contamination.

In addition to these tanks, there was a 15,000 gallon below-ground tank at Twin Lakes which was used to collect waste oil for a 15 to 20 year period. This tank was serviced by an off-base waste oil reclaimer. In 1978 the tank was sold for salvage and the waste oil reclaim operation moved. (See Figure 4.4).

Today at Landfill No. 5, there is a 10,000 gallon horizontal steel tank which was modified to act as an oil-water separator. This tank was used in the early 1970's. The oil would be drawn off to the underground storage tank and the water would be drained to the ground. Periodically

quantities of oil would be discharged along with the water. However the amounts were small and should not have created a contamination problem.

Septic Tanks

There are over 20 septic tanks on the Wright-Patterson AFB serving facilities which are located too far from existing sanitary lines which would economically justify a sewer service connection. Based on the on-site survey; however, these units have been used primarily for the disposal of sanitary sewage and should not pose a hazard from the standpoint of possible groundwater contamination.

Off-Site Disposal Facilities

The methods used for disposal of Wright-Patterson AFB hazardous and non-hazardous wastes include:

- off-site wastes oil contract disposal
- off-site refuse contract disposal
- off-site waste chemical contract disposal

Waste Oil Disposal

Waste oil, waste fuels and hydraulic fluids which are resalable are marketed through DPDO on a competitive bid basis. Each year a contractor is selected. The previous two firms which have been utilized by the base are Clark Oil of Dayton and Ohio Waste Oil of Columbus.

Refuse Disposal

Residential solid waste was placed in landfills on base from 1955 to 1977. Since 1977, all refuse has been hauled off base by a contractor and the existing landfills were closed with the exception of Landfill No. 5 which currently handles fly ash and hardfill.

Waste Chemical Disposal

A list of waste management firms which have been utilized by the base is shown in Table C.5.

EVALUATION OF POTENTIAL CONTAMINATION SOURCES

Twenty four sites associated with Wright-Patterson AFB were identified as containing hazardous material resulting from past activities. These sites have been assessed using a rating system which takes into

account factors such as site characteristics, waste characteristics, potential for contamination and waste management practices. The details of the rating procedure are presented in Appendix G and the results of the assessment are summarized in Table 4.5. Rating scores were developed for the individual sites and the sites are listed in order of ranking. The rating system is designed to indicate the relative need for more detailed site assessment and/or remedial action. The information presented in Table 4.5 should be used as a guide for assigning priorities for dealing with the Wright-Patterson AFB disposal sites. The rating forms for the individual waste disposal sites are presented in Appendix H for review.

In addition to the rating information in Table 4.5, the period of operation is also presented. It should be pointed out that the rating system does not take into consideration a "time factor." This is especially pertinent when considering spills, chemical disposal trenches and the fire training areas.

Landfill No. 10 (Woodland Hills), identified in Table 4.5, utilized from 1965 to 1968, is currently exhibiting a leachate problem and received the highest score of 82. Landfill No. 8, which is adjacent to Building No. 821, received a score of 79 because of the large quantities of hazardous materials which were disposed there and because it currently exhibits a leachate problem. Fire Training Areas No. 3 and 4/Spill No. 1 which were in use from 1960 to 1980 received a score of 77. This is because the area was the site of a fuel spill and was used as a fire training area for 21 years.

Spill No. 2 obtained a ranking of number 4 with a rating of 74. Although recovery procedures were initiated for the spill, only 4000 gallons of fuel were recovered from the initial 8319 gallons which were lost. Landfill No. 12 and No. 11 received scores of 73 and 71, respectively. Both landfills received hazardous wastes and are within the floodplain of the Mad River. Fire Training Areas No. 1 and No. 2, which were operated in the 1950's, received scores of 63 and 61 respectively. Both sites received contaminated fuels during fire training exercises.

Landfills No. 2, 5 and 9 (Sandhill) received scores of 62, 63 and 60. All the landfills have received quantities of hazardous wastes, which resulted in these ratings. Landfills No. 3, 4, 6 and 7 received a

TABLE 4.5

PRIORITY RANKING OF POTENTIAL CONTAMINATION SOURCES

WRIGHT-PATTERSON AFB

Rank	Site Name	Period of Operation	Receptor Subscore	Pathways Subscore	Waste Characteristics Subscore	Waste Management Subscore	Overall Score	Refer To Appendix H Page No.
1	Landfill No. 10 (Woodland Hills)	1965-1968	80	80	100	68	82	H-13
2	Landfill No. 8	1955-1962	80	61	100	78	79	H-9
3	Fire Training Areas 3 & 4 /Spill No. 1	1960-1980	70	74	80	83	77	H-23
4	Spill No. 2	Apr. 1976	86	84	80	46	74	H-25
5	Landfill No. 12	1968-1973	68	52	100	79	73	H-17
6	Spill No. 3	Mar. 1981	86	69	80	50	71	H-27
7	Landfill No. 11	1968-1977	68	59	80	81	71	H-15
8	Landfill No. 5 (Twin Lakes)	1945-Present	78	52	60	67	63	H-7
9	Fire Training Area No. 1	1950-1955	78	49	60	66	63	H-19
10	Landfill No. 2 (Tillman Pit)	1941-1955	75	56	50	69	62	H-3
11	Landfills No. 3, 4, 6 & 7	1945-1962	75	48	50	75	61	H-5
12	Fire Training Area No. 2	Late 1950's	70	49	60	66	61	H-21
13	Landfill No. 9 (Sandhill)	1962-1964	70	33	70	72	60	H-11
14	Coal Storage Pile	Long Term	86	57	60	41	60	H-33
15	Central Heating Plant No. 2 (271)	1940's-1980	78	47	60	54	59	H-37
16	Burial Site No. 1	1966-1971	84	42	60	51	58	H-29
17	Burial Site No. 2	1971-1975	68	48	60	51	56	H-31
18	Landfill No. 1	1920's-1940	70	39	50	69	56	H-1
19	Central Heating Plant No. 1 (66)	1930-1980	67	51	60	43	55	H-35
20	Central Heating Plant No. 3 (170)	1939-1980	74	47	60	22	50	H-39
21	Radioactive Waste Burial Site	Before 1951	63	22	90	19	47	H-47
22	Deactivated Nuclear Reactor	1965-1970	63	27	100	4	47	H-45
23	Central Heating Plant No. 4 (1240)	1957-Present	75	47	60	5	46	H-41
24	Central Heating Plant No. 5 (770)	1956-Present	67	46	60	5	44	H-43

Numbers in parenthesis indicate building numbers

score of 61. This is because a number of these sites were abandoned gravel pits and their use as landfills minimizes any attenuation capacity of the surrounding soils in that the landfill is in direct contact with the groundwater table.

The coal storage pile received a score of 60. This is because the surrounding soils in the area have a low adsorptive capacity for heavy metals and a high permeability which could contribute to groundwater contamination.

All of the existing and recently abandoned central heating plants were rated because of their associated outside coal piles. The ratings varied from 44 to a high of 59 depending upon the particular location of the central plant the design of the actual coal pile itself as to whether it was lined and whether the runoff is collected and treated. Two burial sites received bottoms from tetraethyl lead gasoline storage tanks. These materials are classified as being hazardous under RCRA. These sites received ratings of 58 and 56, respectively.

The radioactive waste burial site which was utilized before 1951 received a rating of 47. This site received this rating since above ground surveys by base personnel in the past indicated no radioactive problems.

CHAPTER 5

CONCLUSIONS

CHAPTER 5
CONCLUSIONS

The goal of Phase 1 of the IRP was to identify the potential for environmental contamination from past waste disposal practices and spill incidents at Wright-Patterson AFB and to assess the probability of contamination migrating beyond the base boundaries. Based on the results of the project team's one week field inspection, review of records and files, and interviews with base personnel, past employees and state and local government employees, the following rankings have been developed. Table 5.1 contains the priority rankings of potential contamination sources at Wright-Patterson AFB. The following conclusions are listed by category.

Landfills

a. Landfill No. 10 (Woodland Hills) has the greatest potential for off-site migration of contaminants and has received a score of 82. The dumping of hazardous chemicals and the existing leachate contamination problem has resulted in this ranking. This situation is further compounded by the site's topographic location and proximity to the base boundary and nearby surface waters.

b. Landfill No. 8 which is adjacent to Building 821 has received an overall score of 79. The site was operated between 1955 to 1962 and contained segregated areas in which chemicals from the research laboratories were deposited. The site is also characterized by an existing leachate problem which has appeared on DuPont Way in the Woodland Hills residential subdivision.

c. Landfill No. 12 which is the fenced in area adjacent to the Ma River had been in operation from 1968 to 1973 and has received a [illegible] of 73. The area was utilized for the burial of chemical[illegible] from the research laboratories in Area B and chemical[illegible] Areas A and C.

TABLE 5.1

SUMMARY RANKING OF POTENTIAL
CONTAMINATION SOURCES

Rank	Site Name	Period of Operation	Overall Score
1	Landfill No. 10 (Woodland Hills)	1965-1968	82
2	Landfill No. 8	1955-1962	79
3	Fire Training Areas 3 & 4/ Spills No. 1	1960-1980	77
4	Spill No. 2	Apr. 1976	74
5	Landfill No. 12	1968-1973	73
6	Spill No. 3	Mar. 1981	72
7	Landfill No. 11	1968-1977	71
8	Landfill No. 5 (Twin Lakes)	1945-Present	63
9	Fire Training Area No. 1	1950-1955	63
10	Landfill No. 2 (Tillman Pit)	1941-1955	62
11	Landfills No. 3,4,6 & 7	1945-1962	61
12	Fire Training Area No. 2	Late 1950's	61
13	Landfill No. 9 (Sandhill)	1962-1964	60
14	Coal Storage Pile	Long Term	60
15	Central Heating Plant No. 2 (Bldg. 271)	1940's-1980	59
16	Burial Site No. 1	1966-1971	58
17	Burial Site No. 2	1971-1975	56
18	Landfill No. 1	1920's-1940	56
19	Central Heating Plant No. 1 (Bldg. 66)	1930-1980	55
20	Central Heating Plant No. 3 (Bldg. 170)	1939-1980	50
21	Radioactive Waste Burial Site	Before 1951	47
22	Deactivated Nuclear Reactor	1965-1970	47
23	Central Heating Plant No. 4 (Bldg. 1240)	1957-Present	46
24	Central Heating Plant No. 5 (Bldg. 770)	1956-Present	44

d. Landfill No. 11 which is adjacent to the Mad River received a score of 71. It was operated from 1968 to 1977. Its location in an abandoned channel once followed by the Mad River and in the floodplain of the river gave it a very high potential for future contamination of adjacent surface waters. Landfill No. 5 located at Twin Lakes and utilized from the mid 40's to the present time received a score of 63. This landfill has received quantities of hazardous material in the past and represents a potential hazard.

e. Landfills No. 2 (scored 62) and 3, 4, 6 and 7 (Scored 61) all have been located in abandoned gravel pits. In all cases, solid wastes were placed in the gravel pits in direct contact with the groundwater. Therefore, there is no attenuation of any leachate originating from the landfill. These sites represent a high contamination potential for surrounding groundwaters. Landfill No. 9 located at Sandhill received a score of 60. Although this site operated for only two years from 1962 to 1964, it received hazardous chemicals from Areas A, B and C.

Fire Training Areas

a. Fire Training Areas 3 and 4 received a score of 77. These areas were also the site of a major petroleum spill (Spill No. 1) which occurred in 1972. The Fire Training Areas were utilized for a 21-year period from 1960 to 1980 and received large quantities of contaminated fuel. Although the areas were flooded with water first to minimize percolation into the soil, it is felt that the prolonged usage of the site combined with a major petroleum spill increased the likelihood of contamination to surface and groundwaters.

b. Fire Training Area No. 1 which was utilized from 1950 to 1955 received a rating of 63. This area because of its remote location was not flooded before the fire training exercises and received large quantities of contaminated fuel. Its relative location to surface waters also increases the likelihood that ground or surface waters were contaminated in the vicinity.

c. Fire Training Area No. 2 which was utilized in the late 1950's received a score of 61. This area was utilized for approximately a 5 year period for fire training exercises which utilized contaminated fuels.

Spills

a. Spill No. 2 (scored 74) occurred in 1976 and according to the Pollution Incident Report resulted in 8,319 gallons of JP-4 being spilled in the POL area. Wells which were placed adjacent to the spill recovered 4,000 gallons of JP-4 which leaves approximately 4,319 gallons unrecovered.

b. Spill No. 3 (scored 72) which occurred in March 1981 resulted in the loss of approximately 2,000 gallons of No. 2 fuel oil. Recovery trenches which were dug adjacent to the spill area did not recovery any of the No. 2 fuel oil.

Central Heating Plants

a. The long term coal storage pile located east of the POL Area in Area C received a rating of 60. The soils in this vicinity have a very low adsorptive ability for heavy metals which could be in the coal pile runoff. The shallow ground water table in this vicinity also increases the likelihood of contamination.

b. Central Heating Plant No. 2 (Bldg. 271) operated from 1940 to 1980 and was recently deactivated. The plant received a rating of 59 because of possible heavy metals, low pH and suspended solids which could originate from the coal pile (Bldg. 66) which was maintained adjacent to the plant.

c. Central Heating Plant No. 1 (Bldg. 66) which was operated from 1930 to 1980 received a rating of 55. Central Heating Plants No. 3 (Bldg. 170), No. 4 (Bldg. 1240) and No. 5 (Bldg. 770) received ratings of 50, 46 and 44, respectively. Heating Plant No. 4 and No. 5 both have existing clarifiers which were utilized to settle out suspended solids in the storm water runoff. No treatment is provided for possible low pH or heavy metals.

Burial Sites

a. Burial Site No. 1 utilized from 1966 to 1971 received quantities of tetraethyl lead gasoline bottoms which were removed from storage tanks during maintenance activities. The site received a score of 58.

b. Burial Site No. 2 operated in the early 70's received a rating of 56. This site like the previous one received tetraethyl lead gasoline tank bottoms.

Radioactivity

a. The deactivated nuclear reactor, which was operated from 1965 to 1970, received a rating of 47. Portions of the reactor are radioactive and have been permanently sealed. Surveys done by base personnel indicate no radioactive problems.

b. The radioactive waste burial site received a score of 47. This site was sealed before 1951 and the contents are unknown. Above ground surveys have indicated no radioactive leakage.

CHAPTER 6

RECOMMENDATIONS

CHAPTER 6

RECOMMENDATIONS

To aid in the comparison of these 24 sites with those sites identified in the IRP of other Air Force bases, a priority ranking scale has been developed. Sites with overall scores of 60 to 100 are of primary concern, based on their potential for contaminant migration off-site. They require further investigation in Phase II. Sites of a secondary concern are those with scores of 55 to 59. All of the remaining sites below a rating of 55 are considered sites having a low potential for contamination and no further monitoring is recommended unless data collected from other higher priority sites indicate a problem. The following recommendations are made to further assess or prevent potential contaminant migration from waste disposal areas at Wright-Patterson AFB. The recommended monitoring program for Phase II is summarized in Table 6.1. Contaminant parameters in this table for landfills are those recommended in the EPA proposed RCRA regulations. Other contaminant parameters in Table 6.1 were selected based on the specific materials handled or disposed at a specific site.

1. Landfill No. 10 (Woodland Hills) and Landfill No. 8 are considered to have a high potential for migration of contaminants. A ground water monitoring program should be established at each site to determine whether there is any contamination. Such a program should consist of at least one monitoring well located hydraulically up-gradient of the site, and three monitoring wells located hydraulically down-gradient of the site. At this time, it is believed that wells comprising such a system will have a total depth on the order of thirty (30) feet. The actual design of a ground water quality monitoring system must be predicted upon site-specific hydrogeologic data. Water samples obtained from the wells should be evaluated using the contaminant parameters presented in Table 6.1.

TABLE 6.1

RECOMMENDED MONITORING PROGRAM FOR PHASE II
WRIGHT-PATTERSON AIR FORCE BASE

Site	Rating Score	Monitoring Technique	Contaminant Parameters
Landfill No. 10 (Woodland Hills)	82	• Four ground water monitoring wells - three downgradient - one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD specific conductance, phenol, total organic halogen.
		• Grab samples should be collected from the drainage ditches adjacent to landfill to characterize leachate during the wet season.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD specific conductance, phenol, total organic halogen.
Landfill No. 8	79	• Four ground water monitoring wells - three downgradient- one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD, specific conductance, phenol, total organic halogen.
		• Grab samples should be collected from the drainage ditches adjacent to landfill to characterize leachate during the wet season.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD specific conductance, phenol, total organic halogen.
Fire Training Areas 3 & 4/ Spill No. 1	77	• Four ground water monitoring wells - three downgradient- one upgradient.	• O&G, TOC, COD
Spill No. 2	74	• Four ground water monitoring wells - three downgradient- one upgradient.	• O&G, TOC
Landfill No. 12	73	• Four ground water monitoring wells - three downgradient- one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD, specific conductance, phenol, total organic halogen.
Spill No. 3	72	• Four ground water monitoring wells - three downgradient- one upgradient.	• O&G, TOC
Landfill No. 11	71	• Four ground water monitoring wells - three downgradient- one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD, specific conductance, phenol, total organic halogen.
Landfill No. 5 (Twin Lakes)	63	• Four ground water monitoring wells - three downgradient- one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD, specific conductance, phenol, total organic halogen.

TABLE 6.1 (CONTINUED)

Site	Rating Score	Monitoring Technique	Contaminant Parameters
Fire Training Area No. 1	63	• Four ground water monitoring wells - three downgradient-one upgradient.	• TOC, COD, O&G
Landfill No. 2 (Tillman Pit)	62	• Four ground water monitoring wells - three downgradient-one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD, specific conductance, phenol, total organic halogen.
Landfills No. 3, 4, 6 & 7	61	• Four ground water monitoring wells - three downgradient-one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD, specific conductance, phenol, total organic halogen.
Fire Training Area No. 2	61	• Four ground water monitoring wells - three downgradient-one upgradient.	• TOC, COD, O&G
Landfill No. 9 (Sandhill)	60	• Four ground water monitoring wells - three downgradient-one upgradient.	• NO_3, Cl, Fe, Mn, Na, SO_4, pH, TOC, COD, specific conductance, phenol, total organic halogen.
Coal Storage Pile	60	• Four ground water monitoring wells - three downgradient-one upgradient.	• pH, Zn, Fe, Mn, Cr
		• Three soil samples collected at 100, 500, and 1500 feet intervals topographically downgradient from the coal pile. A background soil sample should also be collected.	• Ph, Zn, Fe, Mn, Cr

2. Fire Training Areas 3 & 4/Spill No. 1 is also considered to have a high potential for migration of contaminants because of its proximity to the base boundry. A ground water sampling program encompassing four ground water monitoring wells is recommended as shown in Table 6.1.

3. Spills No. 2 and No. 3 both have a high potential for migration. A ground water monitoring program should be established at each site.

4. Landfills No. 12, No. 11, No. 5 (Twin Lakes), No. 2 (Tillman Pit), No. 9 (Sandhill) and No. 3 4, 6 & 7 have a moderate to high potential for migration. An individual ground water monitoring program is recommended for each site to identity specific contaminant parameters and individual concentrations.

5. Fire Training Areas No. 1 and No. 2 have a moderate potential for migration of contaminants. A ground water monitoring program should be initiated at each site.

6. The coal storage pile is considered to have a moderate potential for contaminant migration due to coal pile runoff. To address this site a combined ground water monitoring and soil sampling program is recommended. Four ground water monitoring wells should be installed to determine the level of contamination. Soil sampling should be undertaken at 100, 500 and 1,000 foot intervals topographically down gradient from the coal pile. The soil sampling is necessary since the soil permeability may have minimized downward infiltration into the groundwater and maximized surface runoff.

7. A water sample should be obtained from Well No. 10 (located in the vicinity of Landfill No. 9 - Sandhill), and Wells B and D from the Area "B" well field (located in the vicinity of Landfill No. 5 - Twin Lakes). An organic pollutant scan on the GC/MS using all the organic parameters from EPA's priority pollutant list should be run on the water samples.

8. Landfills No. 8 and 10 (Woodland Hills) should be regraded and revegetated to minimize the potential for leachate generation.

9. Air Force Petroleum Handling Regulations addressing the ultimate disposal of tetraethyl lead sludge from the storage of leaded gasoline should be compared to current RCRA regulations which list tetraethyl lead (Federal Register May 19, 1980; pg. 33125) and leaded tank bottoms from the petroleum industry (F.R.; pg. 33123) as hazardous. AF practice judges the sludge to be nonhazardous after one month of weathering.

APPENDIX A

PROJECT TEAM QUALIFICATIONS

C. M. Mangan, P.E.

J. R. Absalon

M. I. Speigel

M. A. Guthrie

Biographical Data

Charles M. Mangan

Senior Environmental Engineer

PII Redacted

[redacted]

Education

B.S. in Civil Engineering, 1966, Newark Coll of Engineering
M.S. in Civil Engineering, 1967, New York Ur ersity

Professional Affiliations

Registered Professional Engineer (Tennessee 1607, Georgia Pending, New Jersey No. 18366, New York No 280)
Diplomate - American Academy of Environmental Engineers
Water Pollution Control Federation
American Society of Civil Engineers
American Water Works Association

Honorary Affiliations

Chi Epsilon

Experience Record

1967-1970 Quirk Lawler and Matusky Engineers, New York, New York

Project Engineer. Responsible for a $400,000 water system renovation in Walton, New York. This included water main cleaning, a test well program and water main installation. In addition, supervised a surveying team and boring crew used for a stand pipe site evaluation.

As a staff engineer in the design department, participated in the design of an industrial wastewater treatment plant for Carleton Woolen Mills in Maine. Participated in various equipment evaluations prior to the writing of the required specifications.

Evaluated the installation of a centrifuge to increase the sludge dewatering capability of the municipal Bernardsville, New Jersey treatment plant which necessitated renovation of an existing building.

Charles M. Mangan (Continued)

Organized and prepared a hydrology study of the Indian Point area of West Chester County, New York for Consolidated Edison. This study was required by the Atomic Energy Commission as part of their licensing requirements for proposed nuclear reactors.

Prepared a Comprehensive Water Supply Study for Rockland County, New York. The study entailed population and water usage projections and evaluation of existing County water supplies. Various water supply projects, including a pump storage scheme were proposed and corresponding cost estimates were prepared.

Prepared computerized design of various sized domestic wastewater treatment plants for the Federal Water Quality Administration. Work consisted of the detailed sizing of various units (grit chambers, primary and secondary clarifiers, and sludge thickeners) and the preparation of detailed construction drawings.

1970-1980 Roy F. Weston Inc. West Chester, PA and Atlanta, GA

Assistant Project Engineer. Supervised current and diffusion studies off the coast of Aquadilla, Puerto Rico, and subsequently prepared a conceptual design report for a primary wastewater treatment plant and ocean outfall design.

Prepared a reference manual on various wastewater treatment processes which are applicable to the upgrading of existing treatment plants. The manual was used by EPA in their Technology Transfer program at Seminars being held for consulting engineers throughout the United States.

While working in conjunction with the Luzerne County Planning Board, prepared a solid waste regional plan to be implemented under the requirements of Pennsylvania Act 241.

Prepared an operations manual for Washington Suburban Sanitary Commission's (WSSC) 5 MGD advanced wastewater treatment plant at Piscataway, Maryland. Unit operations include 2 stage line precipitation of phosphorus, recarbonation for pH adjustment, dual media filtration and carbon adsorption for suspended and dissolved organics removal.

Charles M. Mangan (Continued)

Prepared a comprehensive water supply for WILMAPCO, a regional planning agency encompassing counties in Maryland, Delaware and New Jersey. This study was required by WILMAPCO in order to obtain certification from H.U.D. for water supply funding.

Supervised the process design for the 30 MGD advanced wastewater treatment plant to be constructed for WSSC at Piscataway, Maryland. Unit operations included two stage suspended biological growth for nitrification and denitrification, alum addition for phosphorus removal, dual media filtration and post aeration. In addition, computer facilities provide the ultimate in automation of an advanced wastewater treatment facility.

Participated in biological treatability studies and the conceptual design of two industrial wastewater treatment plants providing secondary treatment for citric acid and rayon wastewaters, respectively.

Participated on an EPA project which developed supporting information for pretreatment regulations.

Project Manager on biological treatability studies and the conceptual designs of wastewater treatment plants involving cellulose acetate, wire mill, secondary metals refining, and peanut blanching and candy manufacture.

Managed a hazardous sludge disposal study for an industry in Rome, Georgia, which included a preliminary siting study for a hazardous waste landfill.

Prepared over 5 SPCC plans for various industries throughout the Southeast for the containment of oil and hazardous wastes.

Technical consultant on a project which developed a portable treatment process capable of treating 2 million gallons of hazardous wastes from the Anniston Army Depot containing chrome, metals, phenol and large amounts of organics. Associated sludge disposal techniques included dewatering, and chemical fixation with disposal in a sanitary or secure landfill.

Conducted a program to assess phenol contamination of the groundwater table emanating from a lagoon containing wastewater.

Managed a sanitary landfill permitting project for Ft. Benning, Georgia which included multiple site evaluations, waste characterization and quantification.

Charles M. Mangan (Continued)

Project Manager on various phases of three 201 Facilities Plans for Dekalb County, GA., Valparaiso, FL. and Alapaha, GA.

Managed sewer system evaluation surveys for Knoxville, Charlotte and five other smaller communities.

1980-Date Engineering-Science, Inc. Atlanta, Georgia. Manager of Environmental Studies. Recent experience included the water permitting for a petroleum refinery expansion for Hess Oil Co. in southern Mississippi, and developmental permits including Corps Section 404 and 10, and coastal zone permits for 20,000 acres of coastal property in eastern North Carolina. Other pertinent experience includes a site assessment for a pulp and paper mill in southern Alabama and an environmental assessment for a major wastewater treatment plant expansion.

Performed a solid waste management evaluation for New Hanover County, North Carolina. Conducted hazardous waste audits on three U.S. Air Force bases to identify past chemical handling practices and the possibility of contaminant migraton off the base property.

Publications

"Aquadilla, P.R. Current and Diffusion Studies" presented at the Pollution Control Federation - Reconvened Session 1972.

"EPA Effluent Guideline Studies" presented to the Gum and Wood Chemicals Association, Atlanta, GA 1974.

"Hazardous Spill Regulations" presented to the Gum and Wood Chemicals Association. Charleston, SC 1976.

Biographical Data

JOHN R. ABSALON
Hydrogeologist

PII Redacted

[redacted]

Education

B.S. in Geology, 1973, Upsala College, East Orange, New Jersey

Professional Affiliations

Certified Professional Geologist (Indiana No. 46)
Association of Engineering Geologists
Geological Society of America
National Water Well Association

Experience Record

1973-1974 Soil Testing Incorporated-Drilling Contractors, Seymour, Connecticut. Geologist. Responsible for the planning and supervision of subsurface investigations supporting geotechnical, ground-water contamination, and mineral exploitation studies in the New England area. Also managed the office staff, drillers, and the maintenance shop.

1974-1975 William F. Loftus and Associates, Englewood Cliffs, New Jersey. Engineering Geologist. Responsible for planning and management of geotechnical investigations in the northeastern U.S. and Illinois. Other duties included formal report preparation.

1975-1978 U.S. Army Environmental Hygiene Agency, Fort McPherson, Georgia. Geologist. Responsible for performance of solid waste disposal facility siting studies, non-complying waste disposal site assessments, and ground-water monitoring programs at military installations in the southeastern U.S., Texas, and Oklahoma. Also responsible for operation and management of the soil mechanics laboratory.

1978-1980 Law Engineering Testing Company, Atlanta, Georgia. Engineering Geologist/Hydrogeologist. Responsible for the project supervision of waste management, water quality assessment, geotechnical, and hydrogeologic studies at commercial, industrial, and government

John R. Absalon (Continued)

facilities. General experience included planning and management of several ground-water monitoring programs, development of remedial action programs, and formulation of waste disposal facility liner system design recommendations. Performed detailed ground-water quality investigations at Robins Air Force Base in Georgia, a paper mill in southwestern Georgia, and industrial facilities in Tennessee.

1980-Date Engineering-Science. Hydrogeologist. Responsible for supervising efforts in waste management, solid waste disposal, ground-water contamination assessment, leachate generation, and geotechnical and hydrogeologic investigations for clients in the industrial and governmental sectors. Performed geologic investigations at eight Air Force bases and other industrial sites to evaluate the potential for migration of hazardous materials from past waste disposal practices. Conducted RCRA ground-water monitoring studies for industrial clients and evaluated remedial action alternatives for a county landfill in Florida.

Publications

"An Investigation of the Brunswick Formation at Roseland, NJ," 1973, with others, The Bulletin, Vol 18, No. 1, NJ Academy of Science, Trenton, NJ.

"Engineering Geology of Fort Bliss, Texas," 1978, with R. Barksdale, in Terrain Analysis of Fort Bliss, Texas, US Army Topographic Laboratory, Fort Belvoir, VA.

"Geologic Aspects of Waste Disposal Site Evaluations," 1980, with others, Program and Abstracts AEG-ASCE Symposium on Hazardous Waste Disposal, April 26, Raleigh, NC.

"Practical Aspects of Ground-Water Monitoring at Existing Disposal Sites," 1980, with R.C. Starr, Proceedings of the EPA National Conference on Management of Uncontrolled Hazardous Sites, HMCRI, Silver Spring, MD.

"Improving the Reliability of Ground-Water Monitoring Systems," 1981, Proceedings of the Madison Conference of Applied Research and Practice on Municipal and Industrial Waste, University of Wisconsin-Extension, Madison, WI.

Biographical Data

MARK I. SPIEGEL

PII Redacted

Environmental Scientist

[redacted]

Education

B.S. in Environmental Health Science (Magna cum laude), 1976, University of Georgia, Athens, Georgia
Limnology and Environmental Biology, University of Florida, Gainesville, Florida
Business Administration, Georgia State University

Professional Affiliations

American Water Resources Association
Technical Association of the Pulp and Paper Industry

Experience Record

1974-1976 — U.S. Environmental Protection Agency, Surveillance and Analysis Division. Cooperative Student. On assignment to Air Surveillance Branch, participated in ambient air study in Natchez, Mississippi, and operated unleaded fuel sampling program for Southeast National Air Surveillance Network. For Engineering Branch, participated in NPDES compliance monitoring of industrial facilties throughout the southeast; operation and maintenance studies of municipal waste treatment facilities; and post-impoundment study of West Point Reservoir, West Point, Georgia. Participated in industrial bioassay studies for the Ecological Branch.

1977-Date — Engineering-Science. Environmental Scientist. Responsible for the conduct of water and wastewater sampling programs and analyses, quality control, laboratory process evaluations, and evaluation of other environmental assessment data. Conducted leachate extraction studies of sludges produced at a large organic chemicals plant to define nature of sludges according to the Resource Recovery and Conservation Act guidelines. Involved in laboratory quality assurance program for the analysis of water samples used in a stream modeling project. Conducted water quality modeling study for Amerada Hess Corporation to determine the assimilative capacity of a stream receiving effluent from a southern Mississippi refinery.

Mark I. Spiegel (Continued)

Participated in bench-scale industrial treatability studies conducted for the American Textile Manufacturers Institute and Eli Lilly Pharmaceuticals in Mayaguez, Puerto Rico, and in carbon adsorption studies for an American Cyanamid chemical plant and Union Carbide Agricultural Products Division.

Involved in various aspects of several industrial environmental impact assessments including preliminary planning for a comprehensive study for St. Regis Paper Company on a major pulp and paper mill expansion project. Assisted in preparation of third-party EIS for EPA and Mobil Chemical Company concerning a proposed 16,000-acre phosphate mining and beneficiation facility. Developed an EIA prior to construction of a pulp and paper complex by the Weyerhaeuser Company in Columbus, Mississippi, which included preparation of a separate document for the Interstate Commerce Commission concerning the construction of a railroad spur to serve the complex. Also involved in formulating the water quality, water resource and socio-economic aspects of an environmental impact assessment for International Paper Company. Participated in large scale site evaluation to determine the suitability and environmental permitting requirements of a site for an east coast brewery for the Adolph Coors Company. Assisted in development of a peat mining and restoration plan for a private concern in coastal North Carolina.

Project Manager. Conducted comprehensive process evaluation of an 80 mgd wastewater treatment system for Weyerhaeuser Company. Responsible for a study to determine the leaching characteristics of sludges for a paint manufacturing facility for RCRA compliance. Also managed study for development of a solid waste management plan for a ceramic pottery manufacturer in northern Alabama which included evaluating surface and groundwater contamination potential from the existing disposal site and assisting manufacturer in developing a disposal program acceptable to state agencies.

Participated as project team member for Phase I Installation Restoration Program projects for the Department of Defense. Studies were conducted at five Air Force bases to identify past hazardous waste disposal practices that could result in migration of contaminants off base property and recommend priority sites requiring further investigation.

Biographical Data

MARK A. GUTHRIE

Civil and Environmental Engineer

PII Redacted

[redacted]

Education

B.S.E. in Civil Engineering, 1978, Duke University
M.S.C.E. in Environmental Engineering, 1981, Purdue University

Professional Affiliations

Engineer in Training, 1978, North Carolina
Georgia Water & Pollution Control Association
Water Pollution Control Federation
American Society for Microbiology
Society of Industrial Microbiology
American Chemical Society
International Association for Water Pollution Research

Experience Record

1978 - 1981 Purdue University, West Lafayette, Indiana - Graduate Research Assistant. Designed and evaluated an experimental protocol for determining the biodegradability and toxicity of specific priority pollutants during the anaerobic digestion of wastewater sludges. Operated and performed routine analyses on bench-scale anaerobic digestion bioreactors, including gas-liquid chromatographic analyses for pentachlorophenol and dimethylphthalate.

1981 - Date Engineering-Science, Inc., Atlanta, Georgia - Project Engineer. Involved in preliminary engineering activities and operations assistance for industrial waste treatment. Responsibilities include in-plant waste characterization surveys, laboratory and pilot scale treatability studies for physical, chemical, and biological treatment processes, alternative process evaluations and process design development, performance and capacity evaluations of industrial waste treatment facilities, and development of operational strategies for wastewater treatment.

Biological Data - Mark A. Guthrie, Continued

Recent project experience includes wastewater characterization, on-site biological wastewater treatability studies, and operational assistance for a plastics and chemical manufacturing facility with a pure oxygen activated sludge system. The project involved sample collection and analysis, operation of bench-scale Unox bioreactors, and evaluation of the full scale system including solids removal, oxygen transfer capacity, nutrient addition, and secondary clarification.

Previous project experience involved physical and chemical wastewater treatability studies and development of final process design criteria for an upgraded wastewater treatment system at a textile dye and chemical manufacturing facility. The scope of the investigation included collection and treatment of stormwater runoff, neutralization and equalization requirements, primary suspended solids removal, determination of aeration coefficients, and evaluation of biological treatability data.

Other experience includes preliminary design work for a physical-chemical treatment system to remove oil and grease, cyanide, heavy metals, and suspended solids from the process wastewater of a munitions manufacturing facility. Operations experience includes development of key operating strategies and procedures for specific industrial waste treatment facilities, as well as on-site evaluations, operator training, and preparation of operating manuals.

APPENDIX B

INSTALLATION HISTORY

APPENDIX B

INSTALLATION HISTORY

The following information was obtained from the TAB A-1 Report. In May 1917, the Army Signal Corps established a flying school and aviation depot near Fairborn. During that same year, an aviation engineering laboratory was created at McCook Field, north of Dayton. Siting these early military activities at Dayton followed the path initiated by the aviation pioneers, Orville and Wilbur Wright. The brothers, following their successful flight at Kitty Hawk, NC, in December 1903, the next year built a hangar and began a long series of tests and experiments on a prairie which is now part of the Patterson runway.

After World War I, the aviation supply depot and the engineering laboratory continued operations, thus establishing the routes for the major products of Wright-Patterson AFB today; world wide logistics, and research development.

In 1927, the experimental facilities at McCook Field moved to an area renamed Wright Field in honor of the aviation pioneers. Today, that area is known as Area B. Meanwhile the aviation supply depot became the Fairfield Air Depot Reservation. This large military installation encompassed what today is divided into Areas A and C. In July 1931, Fairfield Air Depot Reservation was renamed Patterson Field in honor of Lt. Frank S. Patterson, who died at Wright Field in 1917 in an aerial accident.

During the decades between World Wars, Wright and Patterson Fields paced the development and support of nearly all major facets of the Army Air Corps' expansion, particularly in aircraft design, research and support. In February 1948, the respective Wright and Patterson Fields were merged into Wright-Patterson Air Force Base.

The Air Force Systems Command in 1979 published a detailed engineering history, 1917 to 1978, McCook Field to the Aeronautical Systems Division. This publication is a detailed presentation of a number of organizational realignments which have taken place at Area B during this period in history.

APPENDIX C

MISCELLANEOUS PROJECT DATA

TABLE C.1

WRIGHT-PATTERSON AFB CLIMATIC DATA
Period of Record May 1936 - December 1972

MONTH	TEMPERATURE (°F)					PRECIPITATION (IN)				SNOWFALL (IN)			RELATIVE HUMIDITY (%)		SURFACE WINDS		
	MEAN			EXTREME		MONTHLY			MAX	MONTHLY		MAX	LST		PVLG DRCTN	SPEED	
	DAILY MAX	DAILY MIN	MONTHLY	MAX	MIN	MEAN	MAX	MIN	24 HRS	MEAN	MAX	24 HRS	04	13	(16 PT)	MEAN (KT)	MAX (KT)
JAN	37	21	29	72	-16	2.9	8.9	.0	3.8	7.6	34	8.2	80	70	W	9	63
FEB	40	23	32	73	-11	2.5	5.2	.0	2.6	6	16	8	80	67	W	9	85
MAR	49	31	40	82	-1	3.4	10.0	.6	3.4	5	16	9	78	60	W	9	76
APR	62	1	52	89	18	3.6	7.5	.5	2.0	#	3	3	78	55	W	9	58
MAY	73	51	62	94	26	3.7	12.4	.7	3.9	#	#	#	82	55	SW	7	68
JUN	82	61	72	102	40	4.3	10.8	.4	3.5	0	0	0	85	54	SW	6	66
JUL	85	64	75	102	45	3.1	7.1	.5	2.6	0	0	0	85	53	SW	5	56
AUG	84	62	73	102	40	2.8	8.5	.2	5.3	0	0	0	87	53	S	5	62
SEP	78	55	67	102	28	2.5	5.5	.2	2.1	0	0	0	86	52	S	5	57
OCT	66	44	55	91	20	2.0	6.1	.1	2.2	#	1	1	83	54	S	6	56
NOV	51	34	42	80	1	3.0	6.0	.8	3.3	3	17	8	80	63	S	8	59
DEC	40	25	33	70	-10	2.7	5.5	.8	1.7	5	19	14	80	69	W	8	56
ANN	62	43	53	102	-16	36.4	12.4	.0	5.3	25	19	14	82	59	W	7	85

NOTE: The symbol # indicates a trace of snow recorded.
SOURCE: Detachment 15, 15th Weather Squadron, WPAFB

TABLE C.2

WRIGHT-PATTERSON AIR FORCE BASE

SUMMARY OF INSTALLATION WELL DATA

Well No.	Location (Area Building)	Finished Depth (feet)	Well Head Casing Diameter (inches)	Static water Level (Feet below top of casing)	Yield (gpm)	Drawdown (feet below static water level)	Apparent Till Thickness at Well Location (feet)
1	C 160	58	20	21.5[1]	625[1]	4.4[1]	22
2	C 171	60	12	19[2]	300[2]	3	--
3	C 203	64.5	18	22[2]	1000[2]	2	Not evident on well log
4	C 273	52	20	9[2]	500[2]	4	22
6	A 182	--	--	5[2]	960[2]	7	-
7	C 181	58	20	22[2]	700[2]	2	24
8	C 851	48	20	18[2]	1100[2]	4	17
9	C 852	46	20	10[2]	1200[2]	10	22

SOURCES: INSTALLATION DOCUMENTS AND EAGON (1979)

(1) FROM EAGON (1979)

(2) October, 1981, Installation Data

TABLE C.3

PETROLEUM PRODUCT TANKAGE
Wright-Patterson Air Force Base

Fuel	No. of Tanks	Max. Tank Volume (gallons)	Min. Tank Volume (gallons)	Total Storage Volume (gallons)
JP-4	56	840,000	3,000	5,838,000
Diesel	13	12,000	2,000	78,000
Leaded MOGAS	13	20,000	2,000	122,000
Unleaded MOGAS	4	12,000	5,000	37,000
AVGAS	3	420,000	2,000	432,000
Kerosene	2	12,000	12,000	24,000
Solvent	1	12,000	12,000	12,000
Deicing Fluid	2	25,000	25,000	50,000
JP-5 (Purging Fluid)	6	25,000	5,000	90,000
Fuel Oil	9	212,000	3,000	328,000
Scrap Fuel	19	25,000	2,000	159,000
Scrap Purging	1	25,000	25,000	25,000
Special Fuel	6	25,000	4,000	94,000
Alcohol	3	12,000	10,000	34,000
JP-8	3	25,000	10,000	60,000
White Gas	1	10,000	10,000	10,000

Note: Information obtained from 2750th ABW Spill Prevention Control and Countermeasures Plan (SPCC) revised February, 1979. Table does not account for tankage added or deleted since the preparation of the SPCC.

TABLE C.4

CONSTITUENTS OF TYPICAL COAL PILE RUNOFF

Conventional Measures of Pollution	Range (mg/l)		
pH	2.100	-	6.600
Total Suspended Solids	22.000	-	610.000
Total Dissolved Solids	720.000	-	28,970.000
Turbidity	2.770	-	505.000
Total Hardness	130.000	-	1,851.000
Major Chemical Constituents			
Ammonia	0.000	-	1.770
Nitrate	0.300	-	1.900
Phosphorus	0.200	-	1.200
Sulfate	130.000	-	20,000.000
Chloride	3.600	-	481.000
Aluminum	66.000	-	1,200.000
Iron	0.060	-	4,700.000
Manganese	90.000	-	180.000
Sodium	160.000	-	1,260.000
Trace Element Constituents			
Arsenic	0.005	-	0.600
Beryllium	<0.010	-	0.070
Cadmium	<0.001	-	0.003
Chromium	0.000	-	16.000
Cobalt	0.025	-	--
Copper	0.010	-	3.900
Magnesium	0.000	-	174.000
Mercury	<0.0002	-	0.007
Nickel	0.240	-	0.750
Selenium	<0.001	-	0.030
Zinc	0.006	-	12.500

Source: Impact of RCRA on Utility Solid Wastes. Electric Power Research Institute, August, 1978, pg. 54.

TABLE C.5

CONTRACT WASTE CHEMICAL DISPOSAL FIRMS

1973 - CURRENT

Company Name	Location
Exciton Chemical Co.	Dayton, Ohio
Erieway Pollution Control	Bedford, Ohio
Systech	Dayton, Ohio
University of Dayton	Dayton, Ohio
Chem-Trol	Dayton, Ohio
Pristine	Cincinnati, Ohio
CECOS	Cincinnati, Ohio
Environmental Enterprises	Cincinnati, Ohio

TABLE C.6

WRIGHT-PATTERSON AIR FORCE BASE
OIL-WATER SEPARATORS

No.	Location	Size (gallons)	Connection	Remarks
1	POL Tank Farm, Area C	1600	Storm	
2	POL Tank Farm, Area C	1300	Storm	
3	Taxiway, West Ramp, Area C	6 ea-2400 = 14400	Storm	Continuously Running
4	Bldg 4044, Area C	1200	Sanitary	
5	Bldg 4024, Area C	2700	Sanitary	
6	Bldg 4022, Area C	2700	Sanitary	
7	Bldg 4030, Area C	1500	Sanitary	
8A	Bldg 4020, Area C	150		
8B	Bldg 4020, Area C	150		
9	Bldg 106, Area C	1600	Sanitary	
10A	Bldg 71, Area B	180	Sanitary	
10B	Bldg 71, Area B	1100	Sanitary	
11	Bldg 71A, Area B	1100	Sanitary	
12	Bldg 13, Area C	1100	Sanitary	
13	Bldg 18, Area B	Unknown	--	Cover Bolts Inaccessible
14	Bldg 18C, Area B	250	Sanitary	
15	Bldg 877, Area A	1200	Sanitary	
16	Bldg 109, Area C	900	Sanitary	
17	Taxiway, Area C	6400	Storm	
18	Bldg 60, Area C	800	Sanitary	
19	Bldg 38, Area B	1200	Sanitary	
20	Bldg 448, Area B	900	Sanitary	
21	Bldg 464, Area B	500	Sanitary	
22	Bldg 21, Area B	100	Sanitary	
23	Bldg 142, Area C	1600	Sanitary	

TABLE C.6 (Continued)

WRIGHT-PATTERSON AIR FORCE BASE
OIL-WATER SEPARATORS

No.	Location	Size (Gallons)	Connection	Remarks
24	Bldg 119, Area C	700	Sanitary	
25	Bldg 4024, Area C	6500	Sanitary	
26	Bldg 70, Area B	40	Sanitary	
27A	Bldg 1244, Area C	50	Sanitary	
27B	Bldg 1244, Area C	50	Sanitary	
28	Bldg 169, Area C	Unknown	Abandoned	
29	Bldg 1244, Area C	1500	Sanitary	
30	Bldg 94, Area B	1000 (Est.)	Sanitary	
31	Gun Range, Area B	1500	Sanitary	
32	Gun Range, Area B	1500	Sanitary	
37	Bldg 901, Area C	600	Sanitary	
38	Bldg 55, Area C	4700	Sanitary	
39	Bldg 92, Area B	200	Storm	
40	Bldg 59, Area B	250	Sanitary	
41	Bldg 71, Area B	250	Sanitary	
42	Bldg 48, Area B	200	Storm	
43	Bldg 42, Area B	200	Storm	
44	Bldg 18, Area B	1700	Storm	Continuously Running

DATES OF INSTALLATION NOT AVAILABLE

APPENDIX D

LIST OF INDUSTRIAL SHOPS

APPENDIX D

LIST OF INDUSTRIAL SHOPS

Name	Present Location and Dates (Area and Bldg No.)	Past Location and Dates (Area and Bldg No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Present On-Site T.S.D.*
4950th Test Wing					
AMF/Fabrication and Modification Div.					
AMFS/Metal Cleaning and Plating Shop	B-5	* *	X	X	Drummed to contractor or neutralized to sewer
AMFS/Paint Shop	B-5	* *	X	X	Drummed to contractor
AMFDD/Electronic Printed Wiring Fabrication Facility	B-5	* *	X	X	To sanitary sewer
AMFT/Sheet Metal, Model Branch	B-5	* *	X	X	Drummed to contractor
AMFD/Modification Branch	C-206 (1975 to Present)	B-9 (1940's to 1975)		X	Drummed for DPDO
AMFEC/Machine Shop	B-18	* *			
AMFED/Machine Shop	B-32	* *			
AMFEF/Machine Shop	C-24	* *			
AMFEG/Machine Shop	B-145	* *			
4950TW Avionics Maint. SQ.					
MADE/Precision Measurement Equip. Lab (PMEL)	C-884 (1968 to present)	C-168 (pre 1963 to 1968)	X	X	Drummed to contractor
MADMA/Antenna Shop	C-4042	* *			
MADMH/High Frequency Radio Shop	C-4042	* *			

* Treatment, storage, and/or disposal activities

** Documentation indicated no past building locations existed

APPENDIX D CONT.

Name	Present Location and Dates (Area and Bldg No.)	Past Location and Dates (Area and Bldg No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Present On-Site T.S.D.*
MADMI/Airborn Instrumentation Shop	C-4042	* *			
MADMR/Radio Frequency Shop	C-4042	* *			
MADMT/Recorder Timer Shop	C-4042	* *			
MADNF/Flight Simulator Shop	C-4042	* *			
4950TW Field Maint. SQ.					
MAFER/Supp. Equip. Inspection and Repair	C-109, C-4044 C-4046	* *		X	Stored for DPDO
MAFFC/Corrosion Control Shop	C-105	* *	X	X	Drummed to contractor
MAFFE/Survival Equip. Shop	C-54	* *			
MAFFI/Non-Destructive Insp. Shop	C-13	* *	X	X	Drummed to DPDO
MAFFM/Machine Shop	C-13	* *			
MAFFP/Metal Processing Shop	C-13 (1940's to 1975)	* *	X	X	Drummed to contractor
MAFFS/Structural Repair Shop	C-13	* *			
MAFFS/Structural Repair Zone Shop	C-4026	* *			
MAFPD/Flightline Dispatch Shop	C-4026	* *			
MAFPC/Jet Engine Shop	C-13	* *	X	X	Stored for DPDO
MAFPJ/Test Cell	C-256	* *	X	X	Stored for DPDO
MAFSE/Egress Shop	C-145	* *			
MAFSF/Fuel Systems Shop	C-4020	* *	X		Stored for reuse by POL
MAFSL/Electrical Systems Shop	C-13	* *			
MAFSP/Pneudraulic Shop	C-13	* *			
MAOI/Repair and Reclamation Shop	C-4026	* *		X	Drummed to contractor

* Treatment, storage, and/or disposal activities

** Documentation indicated no past building locations existed

APPENDIX D CONT.

Name	Present Location and Dates (Area and Bldg No.)	Past Location and Dates (Area and Bldg No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Present On-Site T.S.D.*
MAOIR/Wheel and Tire Section	C-13	* *		X	Stored for DPDO
MAFSS/Environmental/Systems Shop	C-4012	* *			
4950th Org. Maint. SQ. MAOI/Corrosion Control	C-4024	* *	X	X	Drummed to contractor
MAOS/Support Equipment Branch	C-106, C-4044 C-4024, C-4028	* *		X	Drumed for DPDO
DIR OF SUPPORT					
SUT/Technical Photographic Division	B-20 (1965 to Present)	B-600,601 (1940's to 1965)	X		Silver recovered to sanitary sewer
AIR FORCE MUSEUM					
MH/ Restoration Div.	B-4	* *	X	X	Drummed to contractor
MJ/Exhibits Div.	B-4	* *	X	X	Drummed to contractor
AF ORIENTATION GROUP (AFOG)					
PDUP/Production Division Print Shop	DESC (1981)	B-6 (1958-1981)	X	X	Drummed to contractor
LGT/Transportation Branch	DESC (1981)	B-4 (1958-1981)	X	X	Drummed for DPDO
XIDA/Art Section	DESC (1981)	B-6 (1958-1981)		X	Drummed to contractor
XIXP/Photo Section	DESC (1981)	B-6 (1958-1981)		X	Silver recovered to sewer

* Treatment, storage, and/or disposal activities

** Documentation indicated no past building locations existed

APPENDIX D CONT.

Name	Present Location and Dates (Area and Bldg No.)	Past Location and Dates (Area and Bldg No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Present On-Site T.S.D.*
DET 2, 1361 AUDIOVISUAL SQ					
PD/Production Branch	B-30	* *	X		X
2750th AIR BASE WING					
Logistics Squadron					
DMTSS/General Purpose Unit and Special Purpose Unit	C-60	* *		X	Drummed for DPDO
DMTSG/Maint. Shop Unit	C-58	* *		X	Drummed for DPDO
DMTSW/Wright Maint. Unit	B-38	* *		X	Drummed for DPDO
SSRH/Auto Hobby Shop	C-1244 Kittyhawk Center	* *	X	X	Drummed for DPDO
DMSD/Base Supply Warehouse	C-2 and 2a	* *	X		
DEMSP/Entomology Unit	A-272	* *	X	X	Triple rinsed to refuse contractor
DEMG/Golf Course Maint.	A-87[illegible]	* *	X	X	Triple rinsed to landfill

* Treatment, storage, and/or disposal activities

** Documentation indicated no past building locations existed

APPENDIX E

LIST OF RESEARCH LABS

APPENDIX E

LIST OF RESEARCH LABORATORIES

Name	Present Location and Dates (Area and Bldg. No.)	Past Location and Dates (Area and Bldg No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Present On-Site T.S.D.*
AFWAL/AAD Avionics Electronic Tech. Div.	B-620, B-22B, B-450		X	X	
AFWAL/AAR Avionics Reconnaissance/Weapon Delivery Division	B-620,B-22, B-23		X	X	
AFWAL/AAW Avionics Electronic Warfare Div.	B-620				
AFWAL/FIB Flight Dynamics Structure/ Dynamics Division	B-45, B-24C, B-65		X	X	
AFWAL/FIE Flight Dynamics Vehicle Equip. Division	B-45, B-31 B-255, Gun Range		X	X	
AFWAL/FIG Flight Dynamics Flight Control Division	B-45, B-145, 194, 450 254, 24C, 93		X	X	
AFWAL/MLB Materials Lab Nonmetallic Materials Division	Area B, 32, 51		X	X	
AFWAL/MLL Materials Lab Metals Keramics Div.	B-32 450	Plating shop 1950's 51	X	X	

* Treatment, storage, and/or disposal activities
** Documentation indicated no past building locations existed.

APPENDIX E (Continued)

LIST OF RESEARCH LABORATORIES

Name	Present Location and Dates (Area and Bldg. No.)	Past Location and Dates (Area and Bldg No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Present On-Site T.S.D.*
AFWAL/MLP Materials Lab Electromagnetic Materials Division	B-651		X	X	
AFWAL/MLS Materials Lab Systems Support Div.	B-652		X	X	
AFWAL/MLT Materials Lab Manufacturing Tech. Div.	B-653, 651		X	X	
AFWAL/MLU Materials Lab Technical Services Div.	653		X	X	
AFWAL/POF Aero Propulsion Lab Tech Facilities Division	18B, 18G 18, 435		X	X	
AFWAL/POO Aerospace Power Division	18A		X	X	
AFWAL/POR Nonjet Engine Division	18D		X	X	
AFWAL/POS Fuels/Lubrication Div.	92, 352 18D, 70	til 1963 90	X	X	
AFWAL/POT Turbine Engine Div.	18A, 18D		X	X	

* Treatment, storage, and/or disposal activities
** Documentation indicated no past building locations existed.

APPENDIX E (Continued)

LIST OF RESEARCH LABORATORIES

Name	Present Location and Dates (Area and Bldg. No.)	Past Location and Dates (Area and Bldg No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Present On-Site T.S.D.*
AFLC/SFQLA Aerospace Fuels Lab	70		X	X	
AFAMRL/BB Biodynamics/Bioengineering Division	33, 441, 824		X	X	
AFAMRL/HE Human Engineering Division	248				
AFAMRL/TH Toxic Hazard ision	79		X	X	
AFAMRL/TS Technical Services Div.	29		X	X	
AFAMRL/VS Veterinary Services Div.	838		X		
AFAMRL/SE Safety Office	29		X		
AFIT/EN Air Fac. Inst. Tech. School of Engineering	640		X	X	
ARL Aerospace Research Lab		till 1975 450	X	X	

* Treatment, storage, and/or disposal activities
** Documentation indicated no past building locations existed.

APPENDIX F

PHOTOGRAPHS

WRIGHT-PATTERSON AFB

LANDFILLS

Landfill No. 2

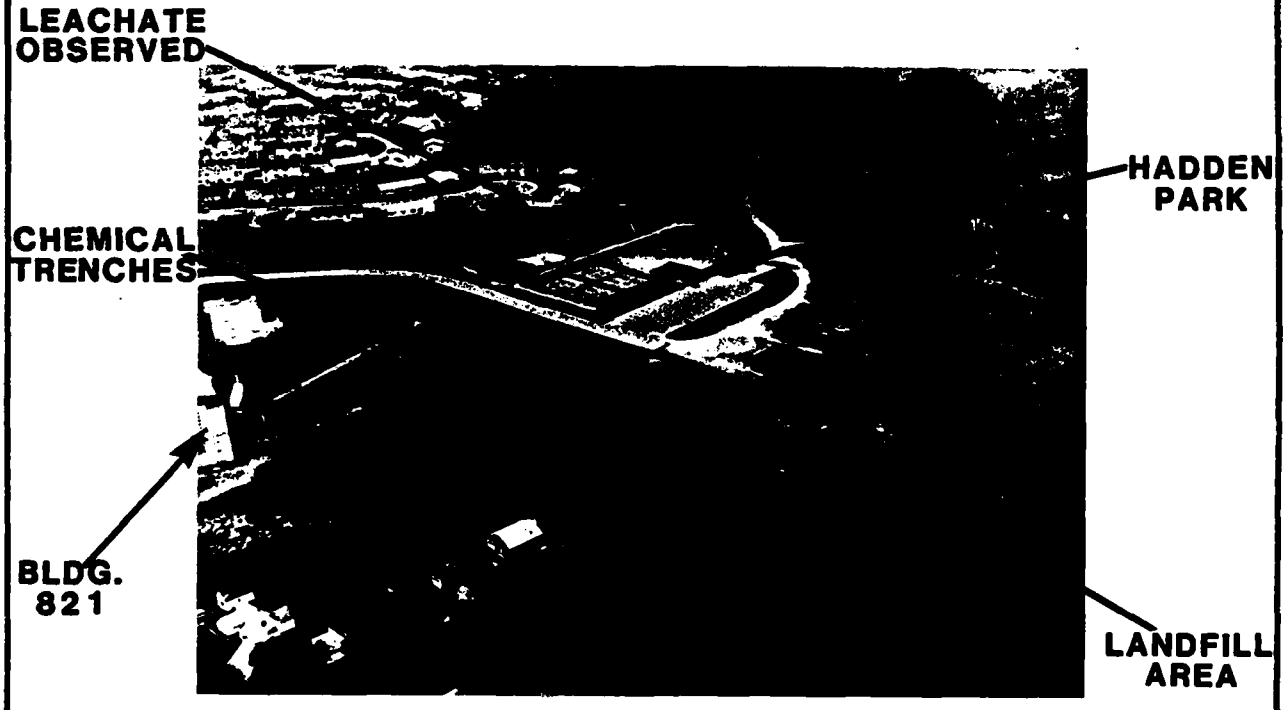
Landfills No. 4, 6 & 7

WRIGHT-PATTERSON AFB

LANDFILLS

(continued)

Landfill No. 5

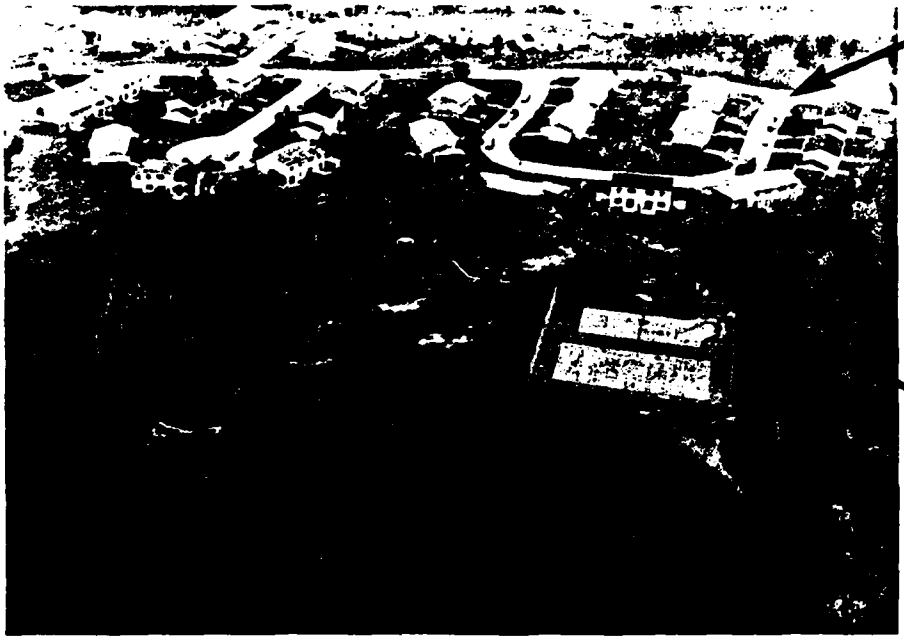


Landfill No. 8

WRIGHT-PATTERSON AFB

LANDFILLS

(continued)



Landfill No. 10

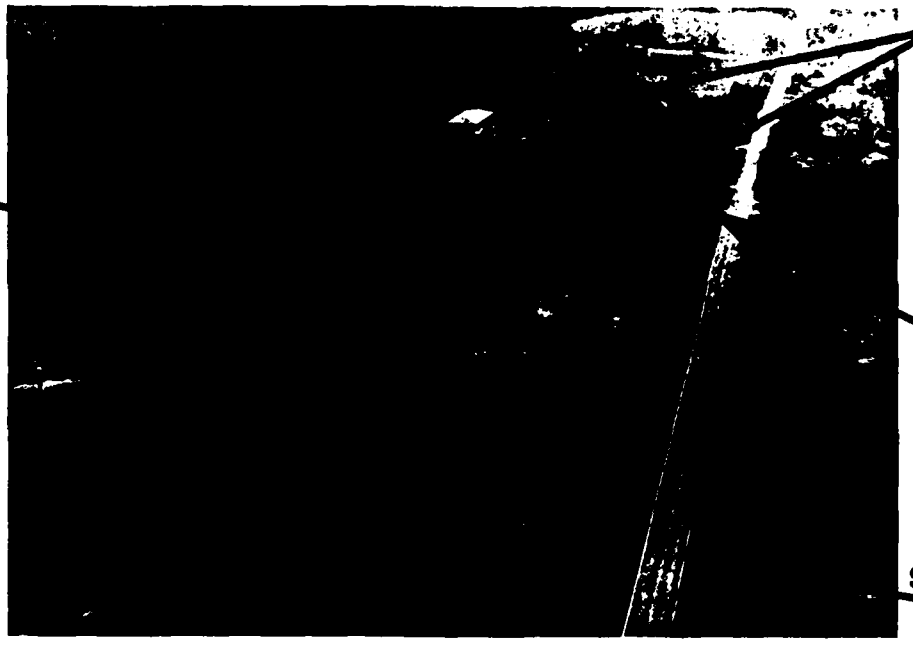
Landfill No. 10

WRIGHT-PATTERSON AFB

LANDFILLS

(continued)

Landfill No. 10



Landfill No. 9

WRIGHT-PATTERSON AFB

LANDFILLS – FIRE TRAINING AREAS

Landfill No. 11

Landfill No. 12

APPENDIX G

HAZARDOUS EVALUATION METHODOLOGY

APPENDIX G

HAZARD EVALUATION METHDOLOGY

PRELIMINARY POTENTIAL CONTAMINATION ASSESSMENT

Various numerical methods for preliminary assessment of sites to determine the need of follow-up action have been developed. Under the auspices of EPA's Office of Enforcement, JRB Associates have devised a methodology for selcting sites for further investigation based on their potential for adverse environmental impact. A modified JRB technique has been developed by Engineering-Science and CH_2M Hill for analysis of the Phase I IRP studies (see memorandum dated July 8, 1981 at end of this Appendix). The methodology relies primarily on available information, but does provide some mechanisms for handling missing data so that sites can be preliminarily rated in most cases. A brief discussion of the rating factor system of analysis follows.

Site Rating Factor System

The following four basic assessment criteria categories are used in the evaluation:

- Receptors
- Pathways
- Waste Characteristics, and
- Waste Management Practices

These categories have been further broken down into 31 generally applicable rating factors as presented in Table G-1. For each of the factors, a four-level rating scale has been developed ranging form "0" (indicating no potential hazard) to "3" (indicating a high potential hazard). These rating scales are also presented in Table G-1. It should be pointed out that these scales have been devised so that rating factors can typically be evaluated on the basis of readily available information from published materials, public and private records, interviews with knowledgeable parties and site visits.

TABLE G.1

RATING FACTOR SYSTEM

RATING FACTORS	RATING SCALE LEVELS 0	1	2	3
		RECEPTORS		
Population Within 1,000 Feet	0	1 to 25	26 to 100	Greater than 100
Distance to Nearest Drinking Water Well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet
Distance to Reservation Boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet
Land Use/Zoning	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential
Critical Environments	Not a critical environment	Pristine natural areas	Wetlands, floodplains, and preserved areas; presence of economically important natural resources	Major habitat of an endangered or threatened species; presence of recharge area
Water Quality Designation of Nearest Surface Water Body	Agricultural or industrial use	Recreation, propagation and management of fish & wildlife	Shellfish propagation and harvesting	Potable water supplies

TABLE G.2

RATING FACTOR SYSTEM (cont'd)

RATING FACTORS	RATING SCALE LEVELS 0	1	2	3
		PATHWAYS		
Evidence of Water Contamination	No contamination	Indirect evidence	Positive proof from direct observation	Positive proof from laboratory analyses
Level of Water Contamination	No contamination	Low levels, trace levels, or levels less than maximum contaminant level (MCL) or EPA drinking water standards	Moderate levels or levels near MCL or EPA drinking water standards	High levels greater than MCL or EPA drinking water standards
Type of Contamination - Soil/ Biota	No contamination	Suspected contamination	Moderate contamination	Severe contamination
Distance to Nearest Surface Water	Greater than 1 mile	2,001 ft to 1 mile	501 ft. to 2,000 ft.	0 to 500 ft.
Depth to Groundwater	Greater than 500 ft.	51 to 500 ft.	11 to 50 ft.	0 to 10 ft.
Net Precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.
Soil Permeability	Greater than 50% clay ($<10^{-6}$ cm/s)	30% to 50% clay (10^{-4} to 10^{-6} cm/s)	15% to 30% clay (10^{-2} to 10^{-4} cm/s)	0 to 15% clay ($>10^{-2}$ cm/s)
Bedrock Permeability	Impermeable ($<10^{-6}$ cm/s)	Relatively impermeable (10^{-4} to 10^{-6} cm/s)	Relatively permeable (10^{-2} to 10^{-4} cm/s)	Very permeable ($>10^{-2}$ cm/s)
Depth to Bedrock	Greater than 60 ft.	31 to 60 ft.	11 to 30 ft.	0 to 10 ft.
Surface Erosion	None	Slight	Moderate	Severe

TABLE G.1

RATING FACTOR SYSTEM (cont'd)

WASTE CHARACTERISTICS

Judgemental hazardous rating from 30 to 100 points based on the following guidelines:

Points	Condition
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

TABLE G.1

RATING FACTOR SYSTEM (con'd)

RATING FACTORS	RATING SCALE LEVELS 0	1	2	3
	WASTE MANAGEMENT PRACTICES			
Record Accuracy and Ease of Access to Site	Accurate records, no unauthorized dumping	Accurate records, no barriers	Incomplete records, no barriers	No records, no barriers
Hazardous Waste Quantity	<1 ton	1 to 5 tons	5 to 20 tons	>20 tons
Total Waste Quantity	0 to 10 acre ft.	11 to 100 acre ft.	101 to 250 acre ft.	Greater than 250 acre ft.
Waste Incompatibility	No incompatible wastes are present	Present, but does not pose a hazard	Present and may pose a future hazard	Present and posing an immediate hazard
Absence of Liners or Confining Strata	Liner and confining strata	*Liner or confining* strata	*Low* quality liner or low permeability strata	No liner, no confining strata
Use of Leachate Collection Systems	Adequate collection and treatment	Inadequate collection or treatment	Inadequate collection and treatment	No collection or treatment
Use of Gas Collection Systems	Adequate collection and treatment	Collection and controlled flaring	Venting or inadequate treatment	No collection or treatment
Site Closure	Impermeable cover	Low permeability cover	Permeable cover	Abandoned site, no cover
Subsurface Flows	Bottom of landfill greater than 5 ft. above high groundwater level	Bottom of landfill occasionally submerged	Bottom of fill frequently submerged	Bottom of fill located below mean groundwater level

Since the rating factors do not all assess the same magnitude of potential environmental impact, a numerical multiplier has been assigned to each factor. These multipliers were developed to indicate the relative magnitude of impact of that factor. In addition, weighting factors have been assigned to the Factor Subscores to arrive at a properly balanced Overall Score.

The folloiwng five hazard potential scores are the result of a site rating:

- Overall Score
- Receptors Subscore
- Pathways Subscore
- Waste Characteristics Subscore, and
- Waste Management Subscore

MEMORANDUM

TO: Mr. Bernard Lindenberg, AFESC, Tyndall AFB, FL
Major Gary Fishburn, USAF OEHL, Brooks AFB, TX

FROM: Norman N. Hatch, Jr., CH_2M HILL, Gainesville, FL, NNH by E/S
Ernest J. Schroeder, Engineering-Science, Atlanta, GA, E/S

DATE: July 8, 1981

SUBJECT: Joint Meeting between CH_2M HILL and Engineering-Science to develop a uniform site rating system for use in all Air Force Installation Restoration Program Records Search Projects.

MEETING LOCATION: CH_2M HILL, Gainesville, Florida office

MEETING DATE: Monday, June 29, 1981

A. Introduction and Purpose

A joint meeting was held at the CH_2M HILL Gainesville, Florida office on Monday, June 29, 1981. The purpose of the meeting was to develop a uniform site rating system for use in all upcoming Air Force Installation Restoration Program Records Search projects. Attendees at the meeting included:

- Norman N. Hatch, Jr., CH_2M HILL Representative
- Ernest J. Schroeder, Engineering-Science Representative
- Major Gary Fishburn, Air Force Observer

The basis for the rating system is the document developed by JRB Associates, Inc., Mclean, Virginia, for the EPA Hazardous Waste Enforcement Office, Washington, D.C. The above document presents a methodology for selecting sites for investigation based on their potential for adverse environmental impact. Careful scrutiny of this document by CH_2M HILL and Engineering-Science indicated that the rating system could readily be used, with some modifications, for evaluating Air Force Installation sites.

These modifications would be necessary for the following reasons:

1. The methodology presented in the JRB document was developed primarily for large landfill operations throughout the nation. Modifications are necessary to accurately address specific Air Force installation conditions.

2. The rating system must include an equivalent comparison of landfill sites and suspected contaminated sites other than landfills, e.g., PCB spills.

B. Modifications to the JRB Rating System

The specific modifications jointly developed by CH_2M HILL and Engineering-Science, based on experience in performing Record Searches at several Air Force installations, are presented in the revised JRB rating form and rating factor system (attached). The modifications, in general, are summarized below:

1. Changes in multipliers for several of the rating factors in the receptors, pathways, and waste management practices categories.

2. Deletion of several existing rating factors and addition of new rating factors in the receptors, pathways, and waste management practices categories.

3. Revision of the waste characteristics category.

4. Special considerations in the use of the waste management practices category to provide meaningful comparison of landfills and contaminated areas other than landfills. These special considerations include:

   a. Use of all nine rating factors for the evaluation of landfills.

   b. Deletion of non-applicable rating factors when evaluating other contaminated areas. The category score is then normalized to provide an equivalent comparison with landfills.

CONCLUSION

All parties present at the meeting agreed that the above modifications would provide a meaningful rating system for Air Force installation sites. The system would be used in the next several Record Searches and then re-evaluated to determine if further modifications are necessary.

NNH/EJS/lmr

APPENDIX H

SITE RATING FORMS

APPENDIX H

SITE RATING FORMS

Table of Contents

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site: Landfill No. 1

Location: Area 3 - Approximately 700 feet west of Air Force Museum

Owner/Operator:

Comments: Operating from the 20's to 1940. Site was an old gravel quarry.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	1	3	3	18
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		*SUBTOTALS*	97	138
Percentage of Assumed Values = 0 %		SUBSCORE		70
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	0	4	0	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	49	126
Percentage of Assumed Values = 0 %		SUBSCORE		39
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Operation involved surface disposal and burning, garbage was segregated from the solid waste and fed to hogs off base. Served only Area B. Small quantities of chemicals from research facilities disposed in landfill.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	2	7	14	21
		SUBTOTALS	97	141
		SUBSCORE		69

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 1 Out of 9

Percentage of Missing and Non-Applicable Values = 11 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 56

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Landfill No. 2 (Tillman Pit)

Location Area 3 - West side of Harshmanville Road

Owner/Operator

Comments Operated as a dump from 1941 to 1955. Used as a landfill disposal site between 1955 and 1975. Abandoned gravel pit.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	104	138
Percentage of Assumed Values = 0 %		SUBSCORE		75
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	2	4	8	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	70	126
Percentage of Assumed Values = 0 %		SUBSCORE		56
Number of Missing Values = 0 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Served only Area B, received chemicals from research facilities..

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM *POSSIBLE* SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	2	7	14	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 1 Out of 9

Percentage of Missing and Non-Applicable Values = 11 %

SUBTOTALS 97 141

SUBSCORE 69

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 62

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site: Landfills No. 3,4,6 & 7

Location: Area A - Adjacent to disposal road, maintenance area and horse barn area

Owner/Operator:

Comments: Landfill 3 operated prior to 1944; Landfill 4 operated between 1945 and 1949. Landfill 6 operated between 1949 and 1952; Landfill 7 operated between 1952 and 1962. All landfills received base refuse from Areas A and C.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	104	138
Percentage of Assumed Values = 0 %		SUBSCORE		75
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	1	4	4	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	61	126
Percentage of Assumed Values = 0 %		SUBSCORE		48
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Landfills served Areas A and C only. Received no chemical waste from Area B.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	3	4	12	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	3	7	21	21
		SUBTOTALS	112	150
		SUBSCORE		75

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicable Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 61

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site: Landfill 5

Location: Area B - Twin Lakes area

Owner/Operator:

Comments: Operated intermittently from the mid 40's to the present time. Previously used as a lumber reclamation area. Presently used for disposing of flyash.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	4	6	18	18
Land Use/Zoning	1	3	3	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	108	138
Percentage of Assumed Values = 0 %		SUBSCORE		78
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	2	5	10	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	2	4	8	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	75	126
Percentage of Assumed Values = 0 %		SUBSCORE		60
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Landfill is currently used for disposing flyash. Known small quantities of hazardous waste placed in landfill.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	2	7	14	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 2 Out of 9

Percentage of Missing and Non-Applicable Values = 22 %

SUBTOTALS 101 150

SUBSCORE 67

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 63

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Landfill No. 8

Location Area B - East of Gate 19B, Hadden Park area - Adjacent to Bldg. 821.

Owner/Operator

Comments Period of operation was from 1955 to 1962, Operated as a trench and cover operation. Leachate observed near residential area.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	111	138
Percentage of Assumed Values = 0 %		SUBSCORE		80
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	2	10	20	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	2	7	14	21
Net Precipitation	1	6	6	18
Soil Permeability	1	6	6	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	3	4	12	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	105	171
Percentage of Assumed Values = 0 %		SUBSCORE		61
Number of Missing Values = 2 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 20 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Received chemical wastes from Area B Labs, animal carcasses from labs, contaminated animal wastes.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	3	7	21	21
Total Waste Quantity	3	4	12	12
Waste Incompatibility	2	3	6	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	1	8	8	24
Subsurface Flows	1	7	7	21

Number of Assumed Values = 0 Out of 9 SUBTOTALS 117 150

Percentage of Assumed Values = 0 % SUBSCORE 78

Number of Missing and Non-Applicable Values = 0 Out of 9 (Factor Score Divided by Maximum

Percentage of Missing and Non-Applicable Values = 0 % Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 79

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site: Landfill No. 9 (Sandhill)

Location: Area C - East end of runway, West of Sand Hill Road

Owner/Operator:

Comments: Period of operation was from 1962 - 1964. First landfill to receive wastes from Areas A,B and C. Operated as trench and cover operation.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	1	3	3	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	97	138
Percentage of Assumed Values = 0 %		SUBSCORE		70
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	3	5	3	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	2	7	14	21
Net Precipitation	1	6	6	18
Soil Permeability	1	6	6	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	2	4	8	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	42	126
Percentage of Assumed Values = 0 %		SUBSCORE		33
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
The landfill was the receptor of Area B wastes; miscellaneous laboratory chemicals were disposed within the landfill.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
* Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21

* Number of Assumed Values = 1 Out of 9
Percentage of Assumed Values = 11 %
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicable Values = 11 %

SUBTOTALS 101 141
SUBSCORE 72
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25
Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 60
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Landfill No. 10 (Woodland Hills)

Location Area B - Off Kaufman Ave.

Owner/Operator

Comments Period of operation was from 1965 to 1968; the landfill served Areas A,B, and C. A residential development borders the fringes of the landfill. Leachate problems reported.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	111	138
Percentage of Assumed Values = 0 %		SUBSCORE		80
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	3	5	15	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	2	7	14	21
Net Precipitation	1	6	6	18
Soil Permeability	1	6	6	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	3	4	12	12
Number of Assumed Values = 1 Out of 10		SUBTOTALS	136	171
Percentage of Assumed Values = 10 %		SUBSCORE		80
Number of Missing Values = 2 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 20 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

A chemical disposal trench was known to exist within this landfill. This trench received miscellaneous chemical wastes generated from the laboratory and shop facilities. Wastes were removed from chemical trench during construction of residential housing in early 70's.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility	3	3	9	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	1	8	8	24
Subsurface Flows	1	7	7	21

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0 %
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicable Values = 0 %

SUBTOTALS 102 150
SUBSCORE 68
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 1 Out of 25
Overall Percentage of Assumed Values = 4 %

OVERALL SCORE 82

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site: Landfill No. 11

Location: Area C - West end of runway, adjacent to Mad River between the fire training area and ordinance disposal area.

Owner/Operator:

Comments: Period of operation was from 1968 to 1977. The site of the landfill coincides with the previous channel of the Mad River and hence is within the existing flood plain.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	94	138
Percentage of Assumed Values = 0 %		SUBSCORE		68
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	3	4	12	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	74	126
Percentage of Assumed Values = 0 %		SUBSCORE		59
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

The landfill received wastes from Areas A, B and C; known moderate quantities of hazardous waste placed in landfill, fuel tank bottom sludges were known to have been disposed of in this landfill.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility	2	3	6	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	3	7	21	21
		SUBTOTALS	121	150
		SUBSCORE		81

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicable Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 71

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Landfill No. 12

Location Area C - Approximately 400 feet south of Landfill No. 11. West end of runway.

Owner/Operator

Comments Cyclone fenced area approximately 60 feet by 50 feet. Period of operation was from 1968 to 1973. Waste drums stored on site were removed in 1974.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	94	138
Percentage of Assumed Values = 0 %		SUBSCORE		68
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	2	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	1	4	4	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	66	126
Percentage of Assumed Values = 0 %		SUBSCORE		52
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Received large quantities of highly toxic wastes from the lab area, site of acid neutralization, received chemicals which were dug up from the Landfill No. 10 chemical trench.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	2	7	14	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	3	3	9	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 1 Out of 9

Percentage of Missing and Non-Applicable Values = 11 %

SUBTOTALS 109 138

SUBSCORE 79

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 73

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Fire Training Area No. 1

Location Area C - Twin Lakes area south of Family Camping area.

Owner/Operator

Comments Fire Training area utilized from 1950 - 1955.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	1	3	3	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	108	138
Percentage of Assumed Values = 0 %		SUBSCORE		78
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	0	4	0	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	62	126
Percentage of Assumed Values = 0 %		SUBSCORE		49
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

The fire training area was saturated with water prior to fuel application. It is likely some fuel percolated into the soil during training operations.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicable Values = 33 %

SUBTOTALS 81 123

SUBSCORE 66

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 63

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Fire Training Area No. 2

Location Area C - North side of Riverview Rd. approximately 1400 feet NE of Landfill 11, directly south of the new fire training area.

Owner/Operator

Comments Fire training area utilized in the late 50's.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	1	3	3	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	97	138
Percentage of Assumed Values = 0 %		SUBSCORE		70
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	0	4	0	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	62	126
Percentage of Assumed Values = 0 %		SUBSCORE		49
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

The fire training area was saturated with water prior to fuel application. It is likely some fuel percolated into the soil during training operations.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0 %
Number of Missing and Non-Applicable Values = 3 Out of 9
Percentage of Missing and Non-Applicable Values = 33 %

SUBTOTALS 81 123
SUBSCORE 66
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25
Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 61

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Fire Training Area No's 3 and 4/Spill No. 1

Location Area C - West end of runway, north side of Riverview Rd., directly south of Landfill No. 11.

Owner/Operator

Comments Fire Training Areas 3 and 4 were adjacent to each other. Fire Training Area 4 currently has an airplane body in it. The training areas were utilized from 1960 to 1980. Oil sheen observed in drainage ditch near area. Site of JP-4 spill in 1971.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	1	3	3	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	97	138
Percentage of Assumed Values = 0 %		SUBSCORE		70
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	2	10	20	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	0	4	0	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	127	171
Percentage of Assumed Values = 0 %		SUBSCORE		74
Number of Missing Values = 2 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 20 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

Fire Training Area 3 was the site of a contaminated fuel storage tank where a 2,000 gallon spill occurred in 1971. The training areas were saturated with water prior to fuel application. It is likely some fuel percolated into the soil during training operations.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	3	7	21	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicable Values = 33 %

SUBTOTALS 102 123

SUBSCORE 83

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 77

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Spill No. 2

Location Area C - POL Tank Farm, Loop Road near Gate 29C.

Owner/Operator

Comments Spill of 8319 gallons of JP-4 in April 1976 adjacent to Tank 256.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	119	138
Number of Assumed Values = 0 Out of 6		SUBSCORE		86
Percentage of Assumed Values = 0 %		(Factor Score Divided by Maximum		
Number of Missing Values = 0 Out of 6		Score and Multiplied by 100)		
Percentage of Missing Values = 0 %				
PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	3	5	15	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	1	4	4	12
		SUBTOTALS	143	171
Number of Assumed Values = 0 Out of 10		SUBSCORE		84
Percentage of Assumed Values = 0 %		(Factor Score Divided by Maximum		
Number of Missing Values = 2 Out of 10		Score and Multiplied by 100)		
Percentage of Missing Values = 20 %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

Approximately 5,000 of the 8,000 gallons of JP-4 spilled in 1976 were recovered using ground water wells.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	0	7	0	21
Hazardous Waste Quantity	2	7	14	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	0	6	0	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0 %
Number of Missing and Non-Applicable Values = 3 Out of 9
Percentage of Missing and Non-Applicable Values = 33 %

SUBTOTALS 56 123
SUBSCORE 46
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25
Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 74
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Spill No. 3

Location Area C - POL Tank Farm, Loop Road

Owner/Operator

Comments Spill of 2,000 gallons of No. 2 fuel oil, in March 1981 - adjacent to Tank 272.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	119	138
Percentage of Assumed Values = 0 %		SUBSCORE		86
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	2	5	10	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	1	4	4	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	118	171
Percentage of Assumed Values = 0 %		SUBSCORE		69
Number of Missing Values = 2 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 20 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

Spill of 2,000 gallons of No. 2 fuel oil - Recovery well placed 3 feet into ground water - little fuel recovered - well abandoned.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	0	7	0	21
Hazardous Waste Quantity	2	7	14	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	-	3	-	-
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	1	6	6	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	62	123
		SUBSCORE		50

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicable Values = 33 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 71

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Burial Site No. 1

Location Area C - Approximately 1200 feet east of coal storage pile, south of Loop Road - Adjacent to old salt shed.

Owner/Operator

Comments Area used as disposal site for leaded fuel storage tank bottom sludge between 1966 and 1971.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	1	3	3	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	116	138
Percentage of Assumed Values = 0 %		SUBSCORE		84
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	3	5	3	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	1	4	4	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	53	126
Percentage of Assumed Values = 0 %		SUBSCORE		42
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

AVGAS storage tank bottom sludges contain lead additives.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	0	7	0	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 2 Out of 9

Percentage of Missing and Non-Applicable Values = 22 %

SUBTOTALS 67 132

SUBSCORE 51

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 58

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site: Burial Site No. 2

Location: Area C - Adjacent to Mad River Levee, along Mustang Road.

Owner/Operator:

Comments: Area used as disposal site for leaded fuel storage tank bottom sludge between 1971 and 1975.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 2 Out of 6		SUBTOTALS	34	138
Percentage of Assumed Values = 33 %		SUBSCORE		68
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	1	4	4	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	61	126
Percentage of Assumed Values = 0 %		SUBSCORE		48
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

AVGAS storage tank bottom sludges contain lead additives. Base garden plots are located with 100 feet of burial site.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	0	7	0	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 2 Out of 9

Percentage of Missing and Non-Applicable Values = 22 %

SUBTOTALS 67 132

SUBSCORE 51

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 56

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site: Coal Storage Pile

Location: Area C - Approximately 1100 feet NE of POL Tank Farm

Owner/Operator:

Comments: Area serves as long term coal storage for base.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	119	138
Percentage of Assumed Values = 0 %		SUBSCORE		86
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	-	5	-	-
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	1	4	4	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	63	111
Percentage of Assumed Values = 0 %		SUBSCORE		57
Number of Missing Values = 4 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 40 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Coal pile runoff typically is characterized by high suspended solids and heavy metals.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	-	7	-	-
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	-	8	-	-
Subsurface Flows	0	7	0	21
		SUBTOTALS	36	87
		SUBSCORE		41

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 4 Out of 9

Percentage of Missing and Non-Applicable Values = 44 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 60

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Central Heating Plant No. 1, Bldg. 66 - Area B

Location

Owner/Operator

Comments Seven coal fired boilers - started in 1930, shut down in 1980 - coal pile in the process of being removed.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	93	138
Percentage of Assumed Values = 0 %		SUBSCORE		67
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	-	4	-	-
Number of Assumed Values = 0 Out of 10		SUBTOTALS	58	114
Percentage of Assumed Values = 0 %		SUBSCORE		51
Number of Missing Values = 4 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 40 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:
Coal pile runoff typically is characterized by high suspended solids and heavy metals. Runoff drained to storm sewer. The coal pile is in the process of being removed, thus reducing any future contamination generated from the area.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	-	7	-	-
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	1	6	6	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0 %
Number of Missing and Non-Applicable Values = 3 Out of 9
Percentage of Missing and Non-Applicable Values = 33 %

SUBTOTALS 48 111
SUBSCORE 43
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25
Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 55
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Central Heating Plant No. 2 - Bldg. 271 - Area A

Location

Owner/Operator

Comments Three coal fired boilers - started between 1940 and 1945, shut down 1980.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	108	138
Percentage of Assumed Values = 0 %		SUBSCORE		78
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	-	4	-	-
Number of Assumed Values = [illegible] Out of 9		SUBTOTALS	54	114
Percentage of Assumed Values = [illegible] %		SUBSCORE		47
Number of Missing Values = [illegible] Out of 9		(Factor Score Divided by Maximum		
Percentage of Missing Values = [illegible] %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Coal pile runoff typically is characterized by high suspended solids and heavy metals.

Runoff drained to storm sewer. The coal pile has been removed and vegetated.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	-	7	-	-
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicable Values = 33 %

SUBTOTALS 60 111

SUBSCORE 54

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 59

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Central Heating Plant No. 3, Bldg. 170, Area C

Location

Owner/Operator

Comments Two coal fired boilers - started between 1939 and 1940.
Shut down 1980. Coal pile removed.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	102	138
Percentage of Assumed Values = 0 %		SUBSCORE		74
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	-	4	-	-
Number of Assumed Values = 3 Out of 10		SUBTOTALS	54	114
Percentage of Assumed Values = 0 %		SUBSCORE		47
Number of Missing Values = 4 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 40 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Coal pile runoff typically is characterized by high suspended solids and heavy metals. Coal pile was contained in an area having a concrete pad and walk. Runoff drained to the storm sewer. The coal pile has been eliminated due to the inactivation of the plant.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	-	7	-	-
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	1	6	6	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection System	-	2	-	-
Site Closure	0	8	0	24
Subsurface Flows	0	7	0	21

Number of Assumed Values = 0 Out of 9 SUBTOTALS 24 111

Percentage of Assumed Values = 0 % SUBSCORE 22

Number of Missing and Non-Applicable Values = 3 Out of 9 (Factor Score Divided by Maximum

Percentage of Missing and Non-Applicable Values = 33 % Score Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 50

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Central Hearing Plant No. 4, Bldg. 1240

Location

Owner/Operator

Comments Five coal fired generators - started 1957, expanded and still operative.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	104	138
Number of Assumed Values = 0 Out of 6		SUBSCORE		75
Percentage of Assumed Values = 0 %		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Number of Missing Values = 0 Out of 6				
Percentage of Missing Values = 0 %				
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	-	4	-	-
		SUBTOTALS	54	114
Number of Assumed Values = 0 Out of 10		SUBSCORE		47
Percentage of Assumed Values = 0 %		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Number of Missing Values = 4 Out of 10				
Percentage of Missing Values = 40 %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Coal pile runoff typically is characterized by high suspended solids and heavy metals. Coal pile is contained in an area having a concrete pad and walls. A clarifier was installed 2 to 3 years ago discharging to storm sewer. Clarifier sludge has never been removed.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	-	7	-	-
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	1	6	6	18
Use of Leachate Collection System	0	6	0	18
Use of Gas Collection System	-	2	-	-
Site Closure	0	8	0	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	6	111
		SUBSCORE		5

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 3 Out of 9

Percentage of Missing and Non-Applicable Values = 33 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 46

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA

ASSESSMENT AND RATING FORM

Name of Site Central Heating Plant No. 5, Bldg. 770 - Area B

Location

Owner/Operator

Comments Five coal fired boilers - started 1956, expanded and still operative.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	93	138
Percentage of Assumed Values = 0 %		SUBSCORE		67
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	3	6	18	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	-	4	-	-
Number of Assumed Values = 0 Out of 10		SUBTOTALS	53	114
Percentage of Assumed Values = 0 %		SUBSCORE		46
Number of Missing Values = 4 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 40 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Coal pile runoff typically is characterized by high suspended solids and heavy metals. Coal pile is contained in an area having a concrete pad and walls. A clarifier was installed 2 to 3 years ago discharging to the storm sewer. Clarifier sludge has never been removed.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	-	7	-	-
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	1	6	6	18
Use of Leachate Collection System	0	6	0	18
Use of Gas Collection System	-	2	-	-
Site Closure	0	8	0	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	6	111
		SUBSCORE		5

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0 %
Number of Missing and Non-Applicable Values = 3 Out of 9
Percentage of Missing and Non-Applicable Values = 33 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25
Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 44

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site: Deactivated Nuclear Reactor

Location: Area B - Facility No. 470, south side of 13th Street

Owner/Operator:

Comments: Reactor was in operation from 1/65 to 6/70.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	87	138
Percentage of Assumed Values = 0 %		SUBSCORE		63
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	2	7	14	21
Net Precipitation	1	6	6	18
Soil Permeability	1	6	6	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	0	4	0	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	34	126
Percentage of Assumed Values = 0 %		SUBSCORE		27
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Containment building houses radioactive material

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	0	7	0	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	-	4	-	-
Waste Incompatibility	1	3	3	9
Absence of Liners or Confining Beds	0	6	0	18
Use of Leachate Collection System	-	6	-	-
Use of Gas Collection System	-	2	-	-
Site Closure	-	8	-	-
Subsurface Flows	-	7	-	-

Number of Assumed Values = 0 Out of 9

Percentage of Assumed Values = 0 %

Number of Missing and Non-Applicable Values = 5 Out of 9

Percentage of Missing and Non-Applicable Values = 56 %

SUBTOTALS 3 69

SUBSCORE 4

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 47

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site: Radioactive Waste Burial Site

Location: Area B - Facility No. 477, west side of 'P' Street

Owner/Operator:

Comments: In place before 1951, contents of container unknown.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	87	138
Percentage of Assumed Values = 0 %		SUBSCORE		63
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum		
Percentage of Missing Values = 0 %		Score and Multiplied by 100)		
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	-	15	-	-
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	2	7	14	21
Net Precipitation	1	6	6	18
Soil Permeability	0	6	0	18
Bedrock Permeability	-	4	-	-
Depth to Bedrock	-	4	-	-
Surface Erosion	0	4	0	12
Number of Assumed Values = 0 Out of 10		SUBTOTALS	28	126
Percentage of Assumed Values = 0 %		SUBSCORE		22
Number of Missing Values = 3 Out of 10		(Factor Score Divided by Maximum		
Percentage of Missing Values = 30 %		Score and Multiplied by 100)		

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:

Designated as old radioactive disposal area.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
* Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	1	3	3	9
Absence of Liners or Confining Beds	0	6	0	18
Use of Leachate Collection System	-	6	-	-
Use of Gas Collection System	-	2	-	-
Site Closure	0	8	0	24
* Subsurface Flows	1	7	7	21
* Number of Assumed Values = 2 Out of 9		SUBTOTALS	24	126
Percentage of Assumed Values = 22 %		SUBSCORE		19
Number of Missing and Non-Applicable Values = 2 Out of 9		(Factor Score Divided by Maximum		
Percentage of Missing and Non-Applicable Values = 22 %		Score and Multiplied by 100)		

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE 47

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

APPENDIX I

GLOSSARY

APPENDIX I

GLOSSARY

AF: Air Force

AFALD: Air Force Logistics Division

AFB: Air Force Base

AFFF: Aircraft Firefighting Foam

AFIT: Air Force Institute of Technology

AFLC: Air Force Logistics Command

AFOG: Air Force Orientation Group

AFR: Air Force Regulation

AFSC: Air Force Systems Command

AFWAL: Air Force Wright Aeronautical Laboratories

AG: Adjutant General

AGE: Aircraft Ground Equipment

ALC: Air Logistics Center

AMRL: Aerospace Medical Research Laboratory

AQUICLUDE: Impermeable formation that impeeds ground-water movement and does not yield water to a well or spring

AQUIFER: A geologic formation, group of formations, or part of a formation that is capable of yeilding water to a well or spring

ARDC: Air Research and Development Command

ARL: Aerospace Research Laboratory

ARTESIAN: Ground water contained under hydrostatic pressure

ASD: Aeronautical Systems Division

AVGAS: Aviation Gasoline

BIOACCUMULATE: Tendency of elements or compounds to accumulate or build up in the tissues of living organisms when they are exposed to these elements in their environments, e.g., heavy metals

CERL: Construction Engineering Research Laboratory

CLOSURE: The completion of a set of rigidly defined functions for a hazardous waste facility no longer in operation

COD: Chemical Oxygen Demand, a measure of the amount of oxygen required to oxidize organic and oxidizable inorganic compounds in water

CONFINED AQUIFER: An aquifer bounded above and below by impermeable beds or by beds of distinctly lower permeability than that of the aquifer itself

CONTAMINATION: The degradation of natural water quality to an extent that its usefulness is impaired; there is no implication of any specific limits since the degree of permissible contamination depends upon intended end use or uses of the water

DESC: Defense Electronic Supply Center

Det: Detachment

DISPOSAL FACILITY: A facility or part of a facility at which hazardous waste is intentionally placed into or on land or water, and at which waste will remain after closure

DISPOSAL OF HAZARDOUS WASTE: The discharge, deposit, injection, dumping, spilling, or placing of any hazardous waste into or on land or water so that such waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground water

DOD: Department of Defense

DOWNGRADIENT: In the direction of lower hydraulic head; the direction in which ground water flows

DPDO: Defense Property Disposal Office

DSA: Defense Supply Agency

DUMP: An uncovered land disposal site where solid and/or liquid wastes are deposited with little or no regard for pollution control or aesthetics; dumps are susceptible to open burning and are exposed to the elements, disease vectors and scavengers

EFFLUENT: A liquid waste discharge from a manufacturing or treatment process, in its natural state, or partially or completely treated, that discharges into the environment

EPA: Environmental Protection Agency

ES: Engineering-Science, Inc.

EROSION: The wearing away of land surface by wind or water

FACILITY: Any land and appurtenances thereon and thereto used for the treatment, storage and/or disposal of hazardous wastes

FCT: Fire Control Training

FLOOD PLAIN: The lowland and relatively flat areas adjoining inland and coastal areas of the mainland and off-shore islands, including, at a minimum, areas subject to a one percent or greater chance of flooding in any given year

FLOW PATH: The direction or movement of ground water and any contaminants that may be contained therein, as governed principally by the hydraulic gradient

GROUND WATER: Water beneath the land surface in the saturated zone that is under atmospheric or artesian pressure

GROUND WATER RESERVOIR: The earth materials and the intervening open spaces that contain ground water

HARDFILL: Disposal sites receiving construction debris, wood, miscellaneous spoil material

HAZARDOUS WASTE: A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed

HAZARDOUS WASTE GENERATION: The act or process of producing a hazardous waste

HEAVY METALS: Metallic elements, including the transition series, which include many elements required for plant and animal nutrition in trace concentrations but which become toxic at higher concentrations

HQ: Headquarters

HWMF: Hazardous Waste Management Facility

INCOMPATIBLE WASTE: A waste unsuitable for commingling with another waste or material because the commingling might result in generation of extreme heat or pressure, explosion or violent reaction, fire, formation of substances which are shock sensitive, friction sensitive, or otherwise have the potential for reacting violently, formation of toxic dusts, mists, fumes, and gases, volatilization of ignitable or toxic chemicals due to heat generation in such a manner that the likelihood of contamination of ground water or escape of the substance into the environment is increased, any other reaction which might result in not meeting the Air, Human Health, and Environmental Standard

INFILTRATION: The flow of liquid through pores or small openings

IRP: Installation Restoration Program

LEACHATE: A solution resulting from the separation or dissolving of soluble or particulate constituents from solid waste or other man-placed medium by percolation of water

LEACHING: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water

LINER: A continous layer of natural or man-made materials beneath or on the sides of a surface impoundmnet, landfill, or landfill cell which restricts the downward or lateral escape of hazardous waste, hazardous waste constituents or leachate

LSD: Land Surface Datum

LWDS: Liquid Waste Disposal System

mg/l: Milligrams (10^{-3}) per liter

ug/l: Micrograms (10^{-6}) per liter

MOGAS: Gasoline for trucks and automobiles

MONITORING WELL: A well used to measure ground-water levels and to obtain samples

MSL: Mean Sea Level

NRC: Nuclear Regulatory Commission

NPDES: National Pollutant Discharge Elimination System

ORGANIC: Being, containing or relating to carbon compounds, especially in which hydrogen is attached to carbon

PCB: Polychlorinated Biphenyls are highly toxic to aquatic life; they persist in the environment for long periods and are biologically accumulative

PERCOLOATION: Movement of moisture by gravity or hydrostatic pressure through interstices of unsaturated rock or soil

PD-680: Cleaning solvent

pH: Negative Logarithm of hydrogen ion concentration

PL: Public Law

POL: Petroleum, Oils and Lubricants

POLLUTANT: Any introduced gas, liquid or solid that makes a resource unfit for a specific purpose

PS-661: Cleaning Solvent

PYROPHORIC: Capable of igniting spontaneously when exposed to air

RCRA: Resource Conservation and Recovery Act

RECHARGE AREA: An area in which water is absorbed that eventually reaches the zone of saturation in one or more aquifers

RECHARGE: The addition of water to the ground-water system by natural or artificial processes

SANITARY LANDFILL: A land disposal site using an engineered method of disposing solid wastes on land in a way that minimizes enviromental hazards

SATURATED ZONE: That part of the earth's crust in which all voids are filled with water

SFQLA: Aerospace Field Laboratory

SLUDGE: The solid residue resulting from a manufacturing or wastewater treatment process which also produces a liquid stream

SOLID WASTE: Any garbage, refuse, or sludge from a waste treatment plant, water suply treatment, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations and from community activities, but does not include solid or dissolved materials in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges which are point source subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 USC 880); or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954 (68 USC 923)

SPILL: Any unplanned release or discharge of a hazardous waste onto or into the air, land, or water

STORAGE OF HAZARDOUS WASTE: Containment, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste

TAC: Tactical Air Command

TCE: Trichloroethylene - a toxic organic solvent

TOXICITY: The ability of a material to produce injury or disease upon exposure, ingestion, inhalation, or assimilation by a living organism

TRANSMISSIVITY: The rate at which water is transmitted through a unit width under a unit hydraulic gradient

TREATMENT OF HAZARDOUS WASTE: Any method, technique, or process including neutralization designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize the waste or so as to render the waste nonhazardous

USAF: United States Air Force

USDA: United States Department of Agriculture

WATER TABLE: Surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere

WPAFB: Wright-Patterson Air Force Base

APPENDIX J

REFERENCES

APPENDIX J

REFERENCES

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APPENDIX K

HAZARD ASSESSMENT RATING METHODOLOGY

WRIGHT PATTERSON AIR FORCE BASE

HAZARD ASSESSMENT PERFORMED
AFTER FEBRUARY 1982 RECORD
SEARCH. THIS ASSESSMENT
REPLACES APPENDIX G AND H OF
ORIGINAL

USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DOD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DOD facilities. One of the actions required under this program is to:

> "develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from USAF Occupational Environmental Health Laboratory (OEHL), Air Force Engineering Services Center (AFESC), Engineering-Science (ES) and CH_2M Hill. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of USAF OEHL, AFESC, various major commands, Engineering Science, and CH_2M Hill met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DOD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination, the waste and its characteristics, potential pathways for waste contaminant migration, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Sites at which there is no containment are not reduced in score. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

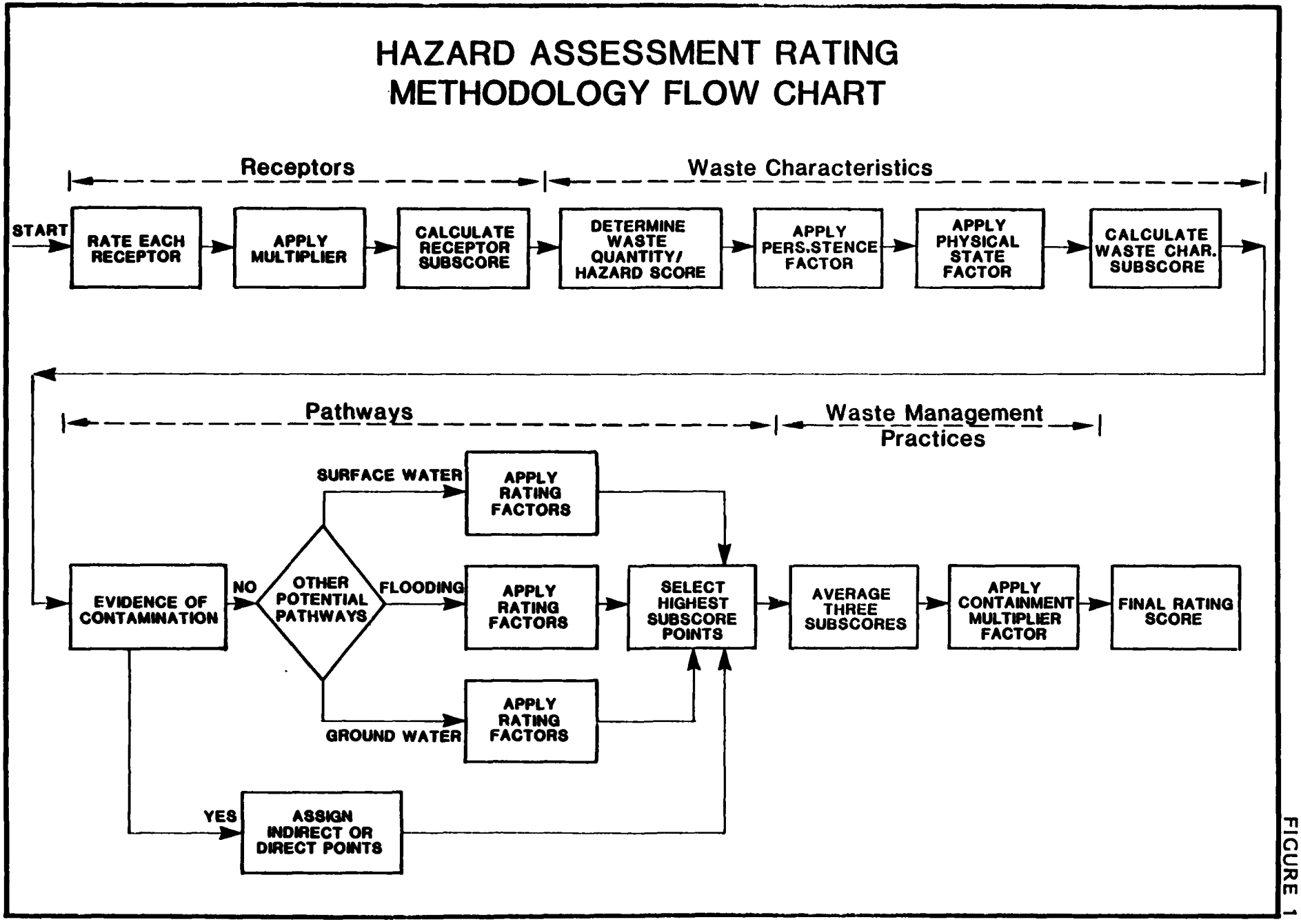
HAZARD ASSESSMENT RATING
METHODOLOGY FLOW CHART
Receptors
Waste Characteristics
START
RATE EACH RECEPTOR
APPLY MULTIPLIER
CALCULATE RECEPTOR SUBSCORE
DETERMINE WASTE QUANTITY/ HAZARD SCORE
APPLY PERS.STENCE FACTOR
APPLY PHYSICAL STATE FACTOR
CALCULATE WASTE CHAR. SUBSCORE
Pathways
Waste Management Practices
SURFACE WATER
APPLY RATING FACTORS
EVIDENCE OF CONTAMINATION
NO
OTHER POTENTIAL PATHWAYS
FLOODING
APPLY RATING FACTORS
SELECT HIGHEST SUBSCORE POINTS
AVERAGE THREE SUBSCORES
APPLY CONTAINMENT MULTIPLIER FACTOR
FINAL RATING SCORE
GROUND WATER
APPLY RATING FACTORS
YES
ASSIGN INDIRECT OR DIRECT POINTS

FIGURE 1

FIGURE 2

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE _____

LOCATION _____

DATE OF OPERATION OR OCCURRENCE _____

OWNER/OPERATOR _____

COMMENTS/DESCRIPTION _____

SITE RATED BY _____

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		

Subtotals _____ _____

Receptors subscore (100 X factor score subtotal/maximum score subtotal) _____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) _____
2. Confidence level (C = confirmed, S = suspected) _____
3. Hazard rating (H = high, M = medium, L = low) _____

Factor Subscore A (from 20 to 100 based on factor score matrix) _____

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

_____ X _____ = _____

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

_____ X _____ = _____

FIGURE 2 (Continued)

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	_____	_____

Subscore (100 X factor score subtotal/maximum score subtotal) _____

2. Flooding

Flooding		1		

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	_____	_____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____
Waste Characteristics _____
Pathways _____

Total _____ divided by 3 = _____
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

_____ X _____ = [ ]

TABLE 1

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1 - 25	26 - 100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/Zoning (within 1 mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential	6
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	3
E. Critical environments (within 1 mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination.	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands.	10
F. Water quality/use designation of nearest surface water body	Agricultural or industrial use.	Recreation, propagation and management of fish and wildlife.	Shellfish propagation and harvesting.	Potable water supplies	6
G. Ground-Water use of uppermost aquifer	Not used, other sources readily available.	Commercial, industrial, or irrigation, very limited other water sources.	Drinking water, municipal water available.	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available.	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1 - 50	51 - 1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1 - 50	51 - 1,000	Greater than 1, 000	6

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (<5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (>20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records.
- o Knowledge of types and quantities of wastes generated by shops and other areas on base.
- o Based on the above, a determination of the types and quantities of waste disposed of at the site.

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records.
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site.

A-3 Hazard Rating

Hazard Category	Rating Scale Levels			
	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

II. WASTE CHARACTERISTICS (Continued)

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
- o Confirmed confidence levels (C) can be added
- o Suspected confidence levels (S) can be added
- o Confirmed confidence levels cannot be added with suspected confidence levels

Waste Hazard Rating
- o Wastes with the same hazard rating can be added
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 POTENTIAL FOR SURFACE WATER CONTAMINATION

Rating Factor	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 in.	-10 to + 5 in.	+5 to +20 in.	Greater than +20 in.	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1 year 24-hr rainfall	<1.0 inch	1.0-2.0 inches	2.1-3.0 inches	>3.0 inches	8

B-2 POTENTIAL FOR FLOODING

Floodplain	Beyond 100-year floodplain	In 25-year floodplain	In 10-year floodplain	Floods annually	1

B-3 POTENTIAL FOR GROUND-WATER CONTAMINATION

Depth to ground water	Greater than 500 ft	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($<10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. WASTE MANAGEMENT PRACTICES FACTOR

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Proection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1 or III-B-3, then leave blank for calculation of factor score and maximum possible score.

APPENDIX L

HAZARD ASSESSMENT RATING METHODOLOGY FORMS

WRIGHT PATTERSON AIR FORCE BASE

HAZARD ASSESSMENT PERFORMED
AFTER FEBRUARY 1982 RECORD
SEARCH. THIS ASSESSMENT
REPLACES APPENDIX G AND H OF
ORIGINAL

HAZARD ASSESSMENT RATING METHODOLOGY SCORES

WRIGHT PATTERSON AIR FORCE BASE

SUMMARY OF REVISED PHASE II RECOMMENDATIONS
WRIGHT PATTERSON AIR FORCE BASE

August 1982

Site	Initial Score/[1] Recommendation	Revised Score/[2] Recommendation	Comments
Landfill No. 8	79/Ground-Water Monitoring Sample Adjacent Drainage Ditches	85/Ground-Water Monitoring Sample Adjacent Drainage Ditches	No Change in Recommendation
Spill No. 2	74/Ground-Water Monitoring	83/Ground-Water Monitoring	No Change in Recommendation
Landfill No. 12	73/Ground-Water Monitoring	81/Ground-Water Monitoring	No Change in Recommendation
Spill No. 3	72/Ground-Water Monitoring	78/Ground-Water Monitoring	No Change in Recommendation
Landfill No. 10 (Woodland Hills)	82/Ground-Water Monitoring Sample Adjacent Drainage Ditches	75/Ground-Water Monitoring Sample Adjacent Drainage Ditches	No Change in Recommendation
Fire Training Areas Nos. 3 & 4/Spill No. 1	77/Ground-Water Monitoring	75/Ground-Water Monitoring	No Change in Recommendation
Fire Training Area No. 1	63/Ground-Water Monitoring	74/Ground-Water Monitoring	No Change in Recommendation
Fire Training Area No. 2	61/Ground-Water Monitoring	73/Ground-Water Monitoring	No Change in Recommendation
Landfill No. 11	71/Ground-Water Monitoring	73/Ground-Water Monitoring	No Change in Recommendation
Landfill No. 5 (Twin Lakes)	63/Ground-Water Monitoring	69/Ground-Water Monitoring	No Change in Recommendation
Landfills Nos. 3, 4, 6, & 7	61/Ground-Water Monitoring	66/Ground-Water Monitoring	No Change in Recommendation
Landfill No. 9 (Sand Hill)	60/Ground-Water Monitoring	66/Ground-Water Monitoring	No Change in Recommendation
Burial Site No. 1	58/None	64/None	No Change in Recommendation
Landfill No. 1	56/None	64/None	No Change in Recommendation
Landfill No. 2 (Tillman Pit)	62/Ground-Water Monitoring	61/None	Drop Site From Phase II Study
Burial Site No. 2	56/None	61/None	No Change in Recommendation
Coal Storage Pile	60/Ground-Water Monitoring Soil Sampling	59/None	Drop Site From Phase II Study
All Other Sites	-/None	-/None	No Change in Recommendation

(1) Hazard Evaluation Methodology, June 1981
(2) Hazard Assessment Rating Methodology, January 1982

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 8

LOCATION Area B -east of Gate 19B, Hadden Park area,adjacent to Bldg. 821

DATE OF OPERATION OR OCCURRENCE 1955 to 1962

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Leachate observed in new residential area

SITE RATED BY Env. Manager

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	158	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 88

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

100 X 1.0 = 100

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

100 X 1.0 = 100

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	3	8	24	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	88	108

Subscore (100 X factor score subtotal/maximum score subtotal) 81

2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	1	8	8	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	88
Waste Characteristics	100
Pathways	81

Total 269 divided by 3 = 90 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

90 x 0.95 = 85

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Spill No. 2

LOCATION Area C - POL Tank Farm, Loop Road near Gate 29C

DATE OF OPERATION OR OCCURRENCE April 1976

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Approximately 8300 gallons JP-4 spilled, 5,000 gallons recovered

SITE RATED BY C. McMangue

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	161	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 89

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

100 X .8 = 80

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

80 X 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	44	108
Subscore (100 X factor score subtotal/maximum score subtotal)				41

2. Flooding

Flooding	0	1	0	3
Subscore (100 x factor score/3)				0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114
Subscore (100 x factor score subtotal/maximum score subtotal)				74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	89
Waste Characteristics	80
Pathways	80

Total 249 divided by 3 = 83 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

83 x 1.0 = 83

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 12

LOCATION Area C - Approximately 400 feet south of Landfill No. 11, west of runway

DATE OF OPERATION OR OCCURRENCE Wright-Patterson AFB

OWNER/OPERATOR Waste drums stored at site were disposed off-base in 1974

COMMENTS/DESCRIPTION Wright-Patterson AFB

SITE RATED BY C M Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	0	3	0	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	3	6	18	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	153	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 85

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	60	108

Subscore (100 X factor score subtotal/maximum score subtotal) 56

2. Flooding	3	1	3	3

Subscore (100 x factor score/3) 100

3. Ground-water migration

Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114

Subscore (100 x factor score subtotal/maximum score subtotal) 74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	85
Waste Characteristics	75
Pathways	100
Total 257 divided by 3 =	86

Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

86 x 1.05 = 91

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Spill No. 3

LOCATION Area C - POL Tank Farm, Loop Road

DATE OF OPERATION OR OCCURRENCE March 1981

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Spill of 2000 gallons of No. 2 fuel oil

SITE RATED BY C. M. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	161	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 89

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 X .8 = 64

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

80 X 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	44	108
Subscore (100 X factor score subtotal/maximum score subtotal)				41

2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114
Subscore (100 x factor score subtotal/maximum score subtotal)				74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors			89
Waste Characteristics			64
Pathways			80
Total 233	divided by 3	=	78
			Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

78 x 1.0 = 78

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 10 (Woodland Hills)

LOCATION Area B - off Kaufman Avenue

DATE OF OPERATION OR OCCURRENCE 1965 to 1968

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Residential development borders landfill. Leachate from site has been reported.

SITE RATED BY [illegible]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	158	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 88

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

100 X 0.9 = 90

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

90 X 0.75 = 68

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	3	8	24	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	80	108

Subscore (100 X factor score subtotal/maximum score subtotal) 74

2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	1	8	8	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 88
Waste Characteris[illegible] 68
Pathways 80

Total 236 divided by 3 = 79
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

79 x 0.95 = 75

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Fire Training Areas No.'s 3 and 4/Spill No. 1

LOCATION Area C, directly south of Landfill No. 11

DATE OF OPERATION OR OCCURRENCE 1960 to 1980, spill occurred in 1972

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION 2000 gallon spill

SITE RATED BY C M Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	144	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 80

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	24
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	52	108

Subscore (100 X factor score subtotal/maximum score subtotal) 48

2. Flooding

Flooding	2	1	2	3

Subscore (100 x factor score/3) 67

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114

Subscore (100 x factor score subtotal/maximum score subtotal) 74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 80
Waste Characteristics ~~72~~
Pathways 74

Total 226 divided by 3 = 75
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

75 x 1.0 = 75

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Fire Training Area No. 1

LOCATION Area C - Twin Lakes area south of family camping area

DATE OF OPERATION OR OCCURRENCE 1950 to 1955

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Waste fuel burned

SITE RATED BY C Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	150	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 83

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	52	108

Subscore (100 X factor score subtotal/maximum score subtotal) 48

2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114

Subscore (100 x factor score subtotal/maximum score subtotal) 74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 83
Waste Characteristics 84
Pathways 74

Total 221 divided by 3 = 74
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

74 x 1.0 = 74

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Fire Training Area No. 2

LOCATION Area C - north side of Riverview Rd. approximately 1400 feet NE of Landfill 11.

DATE OF OPERATION OR OCCURRENCE 1955 to 1960

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Waste fuel burned

SITE RATED BY C M Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	144	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 80

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 X .8 = 64

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

64 X 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	52	108

Subscore (100 X factor score subtotal/maximum score subtotal) 48

2. Flooding | 2 | 1 | 2 | 3

Subscore (100 x factor score/3) 67

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	9	24	24
		Subtotals	84	114

Subscore (100 x factor score subtotal/maximum score subtotal) 74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 80
Waste Characteristics 64
Pathways 74

Total 218 divided by 3 = 73 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

73 x 1.0 = 73

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 11

LOCATION Area C - west end of runway adjacent to Mad River

DATE OF OPERATION OR OCCURRENCE 1968 to 1977

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION 16 acre site, local soil cover, partial vegetation

SITE RATED BY C. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	0	3	0	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	3	6	18	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	153	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 85

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 X 1.0 = 60

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

60 X .75 = 45

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	3	8	24	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	76	108

Subscore (100 X factor score subtotal/maximum score subtotal) 70

2. Flooding

	3	1	3	3

Subscore (100 x factor score/3) 100

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	3	8	24	24
Direct access to ground water	3	8	24	24
		Subtotals	108	114

Subscore (100 x factor score subtotal/maximum score subtotal) 95

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors			85
Waste Characteristics			45
Pathways			100
Total	230	divided by 3 =	77
			Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

77 X 0.95 = 73

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 5

LOCATION Area B - Twin Lakes area

DATE OF OPERATION OR OCCURRENCE 1945 to present

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION 23 acre site, active

SITE RATED BY C M Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	3	6	18	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	162	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 90

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 X 0.9 = 54

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

54 X 0.75 = 41

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	2	8	16	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
Subtotals			68	108
Subscore (100 X factor score subtotal/maximum score subtotal)				63

2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	3	8	24	24
Subtotals			100	114
Subscore (100 x factor score subtotal/maximum score subtotal)				88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	90
Waste Characteristics	41
Pathways	88
Total 219 divided by 3 =	73
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

73 x 0.99 = 69

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfills No. 3, 4, 6 & 7

LOCATION Area A - Adjacent to Disposal Road, maintenance area and horse barn

DATE OF OPERATION OR OCCURRENCE 1945-1962

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION 35 acre site, local soil cover, graded

SITE RATED BY [illegible]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	2	3	6	18
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	3	6	18	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	163	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 91

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

50 x 0.9 = 45

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

45 x 0.5 = 23

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	60	108
Subscore (100 X factor score subtotal/maximum score subtotal)				56

2. Flooding

Flooding	0	1	0	3
Subscore (100 x factor score/3)				0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	3	8	24	24
Direct access to ground water	3	8	24	24
		Subtotals	108	114
Subscore (100 x factor score subtotal/maximum score subtotal)				95

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 95

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	91
Waste Characteristics	95
Pathways	95
Total 209 divided by 3 =	70
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

70 x 0.95 = 66

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 9 (Sand Hill)

LOCATION Area C - east end of runway, west of Sand Hill Road

DATE OF OPERATION OR OCCURRENCE 1962-1964

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION 9 acre site, local soil cover, vegetation

SITE RATED BY C M Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	3	6	18	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	156	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 87

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

72 x 0.75 = 54

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	72	108

Subscore (100 X factor score subtotal/maximum score subtotal) 67

2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	1	8	8	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 67

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 87
Waste Characteristics 54
Pathways 67

Total 208 divided by 3 = 69
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

69 x 0.95 = 66

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Burial Site No. 1

LOCATION Area C - Approximately 1200 feet east of coal storage pile

DATE OF OPERATION OR OCCURRENCE 1966-1971

OWNER/OPERATOR Wright Patterson AFB

COMMENTS/DESCRIPTION Disposal site for leaded fuel storage tank bottom sludge

SITE RATED BY C. McMinger

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	158	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 88

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

50 x .8 = 40

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

40 x .75 = 30

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	44	108

Subscore (100 X factor score subtotal/maximum score subtotal) 41

2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114

Subscore (100 x factor score subtotal/maximum score subtotal) 74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	88
Waste Characteristics	30
Pathways	74
Total 192 divided by 3 =	64
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

64 X 1.0 = 64

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 1

LOCATION Area B - Approximately 700 feet west of Air Force Museum

DATE OF OPERATION OR OCCURRENCE 1920's to 1940

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION 6.5 acre site, local soil cover, grass vegetation

SITE RATED BY C M Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	3	6	18	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	156	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 87

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 X .9 = 27

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

27 X 1.0 = 27

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	36	108

Subscore (100 X factor score subtotal/maximum score subtotal) 33

2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	3	8	24	24
		Subtotals	100	114

Subscore (100 x factor score subtotal/maximum score subtotal) 88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 87
Waste Characteristics [illegible]
Pathways [illegible]

Total [illegible] divided by 3 = [illegible] Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

67 X .95 = 64

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Landfill No. 2 (Tillman Pit)

LOCATION Area B - west side of Harshmanville Road

DATE OF OPERATION OR OCCURRENCE 1941 to 1955 operated as dump; 1955-1975 as landfill disposal site.

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION 9 acre site, local soil cover, partial vegetation

SITE RATED BY CMangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	3	6	18	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	163	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 91

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 X 0.9 = 27

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

27 X 0.5 = 14

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	2	8	16	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	68	108
Subscore (100 X factor score subtotal/maximum score subtotal)				63

2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	3	8	24	24
		Subtotals	100	114
Subscore (100 x factor score subtotal/maximum score subtotal)				88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	91
Waste Characteristics	14
Pathways	38
Total 193 divided by 3 =	64
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

64 x .95 = 61

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Burial Site No. 2

LOCATION Area C - Adjacent to Mad River Levee, along Mustang Road

DATE OF OPERATION OR OCCURRENCE 1971 to 1975

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Disposal site for leaded fuel storage tank bottom sludge

SITE RATED BY [illegible]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	20
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	144	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 80

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

50 X .8 = 40

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

40 X .75 = 30

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	60	108

Subscore (100 X factor score subtotal/maximum score subtotal) 56

2. Flooding	2	1	2	3

Subscore (100 x factor score/3) 67

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114

Subscore (100 x factor score subtotal/maximum score subtotal) 74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	80
Waste Characteristics	[illegible]
Pathways	74

Total 184 divided by 3 = 61
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

61 x 1.0 = 61

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Coal Storage Pile

LOCATION Area C - Approximately 1100 feet northeast of POL Tank Farm

DATE OF OPERATION OR OCCURRENCE

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Area serves as long term coal storage for base

SITE RATED BY C M Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	18
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	161	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 89

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 x 1.0 = 30

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

30 x 0.5 = 15

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	44	108
		Subscore (100 X factor score subtotal/maximum score subtotal)		41

2. Flooding

Flooding	0	1	0	3
		Subscore (100 x factor score/3)		0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114
		Subscore (100 x factor score subtotal/maximum score subtotal)		74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors [illegible]
Waste Characteristics [illegible]
Pathways [illegible]

Total 178 divided by 3 = 59
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

59 x 1.0 = 59

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Radioactive Waste Burial Site

LOCATION Area B - Facility No. 477, west side of 'P' Street

DATE OF OPERATION OR OCCURRENCE Prior to 1951

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Contents unknown, area posted as radioactive wastes

SITE RATED BY C. Williams

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	18
D. Distance to reservation boundary	2	6	12	12
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	6
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	139	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 77

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

40 X 1.0 = 40

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

40 X 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	3	6	18	18
Rainfall intensity	2	8	16	24
		Subtotals	62	108
		Subscore (100 X factor score subtotal/maximum score subtotal)		57

2. Flooding

Flooding	0	1	0	3
		Subscore (100 x factor score/3)		0

3. Ground-water migration

Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	0	8	0	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	60	114
		Subscore (100 x factor score subtotal/maximum score subtotal)		53

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 57

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	77
Waste Characteristics	50
Pathways	57
Total 174 divided by 3 =	58
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

58 X 0.95 = 55

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Central Heating Plant No. 2

LOCATION Bldg. 271 - Area A

DATE OF OPERATION OR OCCURRENCE 1940 to 1980

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Coal pile removed, area revegetated

SITE RATED BY C. M. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	155	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 86

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 X 1.0 = 30

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

30 X 0.5 = 15

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	-	8	-	-
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	36	84
		Subscore (100 X factor score subtotal/maximum score subtotal)		43

2. Flooding	0	1	0	3
		Subscore (100 x factor score/3)		0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
		Subtotals	60	114
		Subscore (100 x factor score subtotal/maximum score subtotal)		53

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 53

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	86
Waste Characteristics	15
Pathways	53
Total 154 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

51 X 1.0 = 51

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Central Heating Plant No. 4

LOCATION Bldg. 1240

DATE OF OPERATION OR OCCURRENCE 1957 to present

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Clarifier treats coal pile runoff

SITE RATED BY C. McLerran

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	2	3	6	18
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	151	130

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 34

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

30 x 1.0 = 30

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

30 x 0.5 = 15

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	-	8	-	-
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	36	84
		Subscore (100 X factor score subtotal/maximum score subtotal)		43

2. Flooding	0	1	0	3
		Subscore (100 x factor score/3)		0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
		Subtotals	60	114
		Subscore (100 x factor score subtotal/maximum score subtotal)		53

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 53

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	81
Waste Characteristics	15
Pathways	53
Total 152 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

51 x 1.0 = **51**

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Central Heating Plant No. 1

LOCATION Bldg. 66 - Area B

DATE OF OPERATION OR OCCURRENCE 1930 to 1980

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Coal pile in the process of being removed

SITE RATED BY C. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	18
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	145	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 81

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 x 1.0 = 30

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

30 x 0.5 = 15

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	-	8	-	-
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	44	84

Subscore (100 X factor score subtotal/maximum score subtotal) 52

2. Flooding

	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
		Subtotals	60	114

Subscore (100 x factor score subtotal/maximum score subtotal) 53

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 53

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	31
Waste Characteristics	15
Pathways	53

Total 149 divided by 3 = 50 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

50 x 1.0 = 50

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Central Heating Plant No. 3

LOCATION Bldg. 170 - Area C

DATE OF OPERATION OR OCCURRENCE 1939 to 1980

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Coal pile removed

SITE RATED BY C M Flanagan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	2	3	6	18
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	149	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 83

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 X 1.0 = 30

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

30 X 0.5 = 15

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	-	8	-	-
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	36	84

Subscore (100 X factor score subtotal/maximum score subtotal) 43

2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
		Subtotals	60	114

Subscore (100 x factor score subtotal/maximum score subtotal) 53

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 53

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	83
Waste Characteristics	15
Pathways	53
Total 151 divided by 3 =	50
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

50 X 1.0 = 50

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Central Heating Plant No. 5

LOCATION Bldg. 770 - Area B

DATE OF OPERATION OR OCCURRENCE 1956 to present

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Clarifier treats coal pile runoff

SITE RATED BY C. Mirarchi

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	145	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 81

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 X 1.0 = 30

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

30 X 0.5 = 15

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	-	8	-	-
Surface permeability	0	6	0	18
Rainfall intensity	2	8	16	24
		Subtotals	44	84
Subscore (100 X factor score subtotal/maximum score subtotal)				52

2. Flooding

Flooding	0	1	0	3
Subscore (100 x factor score/3)				0

3. Ground-water migration

Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
		Subtotals	60	114
Subscore (100 x factor score subtotal/maximum score subtotal)				53

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 53

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	91
Waste Characteristics	55
Pathways	53
Total 149 divided by 3 =	50
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practice Factor = Final Score

50 x 1.0 = 50

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Deactivated Nuclear Reactor

LOCATION Area B - Facility No. 470, south side of 13th Street

DATE OF OPERATION OR OCCURRENCE In operation 1965 to 1970

OWNER/OPERATOR Wright-Patterson AFB

COMMENTS/DESCRIPTION Containment building contains radioactive material

SITE RATED BY [illegible]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	18
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	139	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 77

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

100 X 1.0 = 100

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

100 X .5 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore N/A

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	56	108

Subscore (100 X factor score subtotal/maximum score subtotal) 52

2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	1	8	8	24
Subsurface flows	-	8	-	-
Direct access to ground water	0	8	0	24
		Subtotals	36	90

Subscore (100 x factor score subtotal/maximum score subtotal) 40

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 52

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 77
Waste Characteristics 50
Pathways 52

Total 179 divided by 3 = 60

Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

60 x 0.10 = 6